# Pathways to Improving Maternal Mortality in Rural Nepal

by

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# Statement of Originality

I hereby certify that the work embodied in the thesis is my own work, conducted under normal supervision. The thesis contains no material which has been accepted, or is being examined, for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made. I give consent to the final version of my thesis being made available worldwide when deposited in the University's Digital Repository, subject to the provisions of the Copyright Act 1968.

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Binod Bindu Sharma

November 2018

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I hereby certify that this thesis is in the form of a series of papers. I have included as part of the thesis a written declaration from each co-author, endorsed in writing by the Faculty Assistant Dean (Research Training), attesting to my contribution to any jointly authored papers.

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By signing below, I confirm that Binod Bindu Sharma contributed to the publication titled "Systematic Review of Community Participation Interventions to Improve Maternal Health Outcomes in Rural South Asia" in the following manner: by writing and registering the review protocol; finalising the search strategies; conducting the database searches for related articles; screening the search results; assessing the eligibility of studies for inclusion and extracting relevant data; and contacting their authors for additional information, where appropriate.

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By signing below, I confirm that Binod Bindu Sharma contributed to the publication "A First Step to Improving Maternal Mortality in A Low-Literacy Setting; the Successful Use of Singing to Improve Knowledge Regarding Antenatal Care" through project design, writing and registering the protocol, conceiving and organising the research project, meeting ethics requirements, and organising all aspects of the intervention, including all surveys.

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By signing below, I confirm that Binod Bindu Sharma contributed to the submission for publication "Review of Safe Motherhood Policy, 1998, Nepal" by developing the review protocol, finalising the review strategies, conducting the relevant document searches, analysing and discussing the data and writing the manuscript.

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By signing below, I confirm that Binod Bindu Sharma contributed to the following publications;

1. “Systematic Review of Community Participation Interventions to Improve Maternal Health Outcomes in Rural South Asia” in the following manner: by writing and registering the review protocol; finalising the search strategies; conducting the database searches for related articles; screening the search results; assessing the eligibility of studies for inclusion and extracting relevant data; and contacting their authors for additional information, where appropriate.

2. “Pathways to Improving Maternal Mortality in Rural Nepal”, his contribution included: designing and developing the concept of the research video documentary, developing the storyboard; seeking ethics approval; collecting video footage and other relevant information; editing and finalising the video and submitting it for publication.

3. “Pathways to Improving Maternal Mortality in Remote, Rural Nepal, PhD Project of Binod Bindu Sharma” by developing the design of the intervention research eBook. Sought ethics approval to collect photographs and all relevant information necessary to develop and finalise the eBook to the publication

4. “A First Step to Improving Maternal Mortality in A Low-Literacy Setting; the Successful Use of Singing to Improve Knowledge Regarding Antenatal Care” through project design, writing and registering the protocol, conceiving and organising the research project, meeting ethics requirements, and organising all aspects of the intervention, including all surveys.

5. “Use of Songs Leads to Long-term Improvement in Knowledge of Antenatal Care in a Predominantly Illiterate Community” by designing the project, writing and registering the protocol, seeking ethics approval, organising all aspects of the intervention (including all surveys), and analysing the resulting data.

6. “Review of Safe Motherhood Policy, 1998, Nepal” by developing the review protocol, finalising the review strategies, conducting the relevant document searches, analysing and discussing the data and writing the manuscript for submission.

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# Publication List

**Journal Publications (full text)**

The work presented in this thesis has directly resulted in the following publications:

1. **Sharma B.B.**, Jones L, Loxton DJ, Booth D, Smith R: Systematic review of community participation interventions to improve maternal health outcomes in rural South Asia. BMC Pregnancy and Childbirth 2018, 18(1):327. https://doi.org/10.1186/s12884-018-1964-1

2. **Sharma, B.B.,** et al., A first step to improving maternal mortality in a low literacy setting; the successful use of singing to improve knowledge regarding antenatal care. American Journal of Obstetrics and Gynecology, 2018. https://doi.org/10.1016/j.ajog.2018.09.038

**Abstract Publications**

The work presented in this thesis has directly resulted in the following abstract publications as part of conference presentations:

1. **Sharma B.B.**, Loxton DJ, Murray H, Angeli GL, Oldmeadow C, Chiu S, Smith R: Use of Songs Leads to Long-term Improvement in Knowledge of Antenatal Care in a Predominantly Illiterate Community. Reproductive Sciences, 2018;25;214A. http://journals.sagepub.com/doi/pdf/10.1177/1933719118759999

**Conference Presentations**

The work presented in this thesis has directly resulted in the following conference presentations:

1. **Sharma B.B.**, Loxton DJ, Murray H, Angeli G, Oldmeadow C, Chiu S, Smith R: Use of Songs Leads to Long-term Improvement in Knowledge of Antenatal Care in a Predominantly Illiterate Community. Reproductive Sciences, 2018;25;214A. Poster presentation delivered at the 65th Annual Meeting of the Society for Reproductive Investigation, March 6-10, San Diego, CA.

**Manuscripts Prepared for Publication**

The work presented in this thesis has directly resulted in the development of the review report to be submitted for publication as follows:

1. Sharma B.B., Loxton D.J., Lohani G.R., Pokharel G.S., Sharma S.K., Sharma B., and Smith R., Review of Safe Motherhood Policy (1998), Nepal. (Manuscript submitted for publication in the WHO South-East Asia Journal of Public Health).

**Video Documentary Published.**

The work presented in this thesis has directly resulted in the development of an intervention research video documentary, and resulted in the following publications:

1. **Sharma B.B.**, Loxton DJ, Murray H, Angeli G, Oldmeadow C, Chiu S, Smith R: Pathways to Improving Maternal Mortality in Rural Nepal. Intervention research video published along with the article, link: https://youtu.be/g8z0Vujkrh4

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# List of Abbreviations

| | |
|---|---|
| AARM | AIDS Risk Reduction Model |
| AIDS | Acquired Immune Deficiency Syndrome |
| AM | Member of the Order of Australia |
| ANC | Antenatal Care |
| ANOVA | Analysis of Variance |
| AUD | Australian Dollar |
| B. A. | Bachelor of Arts |
| BMC | BioMed Central |
| CA | California |
| CDO | Chief District Officer |
| CI | Confidence Interval |
| DHE | Diploma in Health Education |
| FCHV | Female Community Health Volunteer |
| HBM | Health Belief Model |
| HMRI | Hunter Medical Research Institute |
| HREC | Human Research Ethics Committee |
| IBM | International Business Machines |
| MLE | Maximum Likelihood Estimator |
| NHSS | Nepal Health Sector Strategy |
| NSW | New South Wales |
| OAM | Medal of the Order of Australia |
| PA | Public-Address |
| PhD | Doctor of Philosophy |
| RCT | Randomized Control Trial |

| | |
|---|---|
| SBA | Skilled Birth Attendant |
| SDGs | Sustainable Development Goals |
| SPSS | Statistical Package for the Social Sciences |
| SUB | State University of Bangladesh |
| TU | Tribhuvan University |
| UNESCO | United Nations Educational, Scientific and Cultural Organisation |
| UNFPA | United Nations Population Fund |
| USA | United States of America |
| VDC | Village Development Committee |
| WHO | World Health Organisation |

# Abstract

Worldwide maternal mortality, particularly in low-resource economies like Nepal, is unacceptably high. Lack of knowledge, lack of accessible care and unsupportive sociocultural practices are the main causes of poor maternal health outcomes.

We first conducted a systematic literature review which revealed the importance of community support and cultural sensitivity in designing effective public health education programs. The results have been published in a peer reviewed journal, link: https://doi.org/10.1186/s12884-018-1964-1. As community singing and dancing play a central role in Nepalese rural life, we then designed a program to improve community knowledge of key maternal health issues through the use of songs and a wall chart illustrating key points. The population chosen for study was located in one of the remote hill districts of Nepal. One cluster of villages (the intervention cluster) received the program while another similar cluster (the control) did not. The clusters were assessed by pre- and post-intervention surveys to record the results. The key health messages were defined with expert assistance, but the program involved every section of the community, under the leadership of local people, to fine-tune it to suit the local culture and context. Together, we organised a song competition incorporating safer pregnancy and childbirth messages in songs. The winning songs were then taken to the wider community through singing and dancing. To complement these messages, and to encourage the villagers to value them, a pictorial "Holy Duty" wall chart, incorporating pictures of local gods, was also developed. Our program was designed to educate family members with limited literacy, especially mothers-in-law who are key figures in the rural Nepalese family. Male involvement was also essential for decisions related to finance and care.

We found there was a significant improvement in the knowledge of the intervention population. Knowledge regarding the importance of antenatal care improved by130.66%; knowledge of supplementary diet and rest during pregnancy improved by 84.37%; knowledge of childbirth planning improved by 95.73%; and knowledge regarding delivery care, the area with the least improvement, by 72.54%. The follow-up data demonstrated that across all ages and genders in the intervention cluster the effect of the intervention was maintained even 12 months after the intervention. There was a negligible change in the control population. The results have been published in a peer reviewed journal, link: https://doi.org/10.1016/j.ajog.2018.09.038. A video documentary has also been created on the work, link: https://youtu.be/g8z0Vujkrh4. An unexpected finding was a remarkable reversal in the community culture where, while it was once taboo for men to discuss pregnancy and childbirth before the intervention, it became uncommon for anyone not to talk about the key issues of pregnancy and childbirth afterwards.

Our research demonstrates that if community education programs are designed, developed and executed properly by addressing community needs and respecting local culture and talents, then long-term positive changes in the knowledge, attitude and practices both at the community and government levels can be realised. The Government of Nepal has already taken important policy decisions to improve maternal health as a result of this project and an in-depth policy review has been presented to it.

# Chapter One
# Introduction

## 1.1 Introduction

Over the last two decades, there has been substantial progress in maternal care leading to a tangible reduction in the global maternal mortality ratio. For example, the worldwide rate of maternal death dropped by almost 50% from 523,000 in 1990 to 289,000 in 2013 [1]. Yet, globally, women still die at an intolerably high number (800) every day due to pregnancy, labour and childbirth related complications. Ninety-nine percent of these maternal deaths occur in low income countries [2-5].

Maternal mortality is defined by the World Health Organization as the "…*death of a woman while pregnant or within 42 days of birth, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes*" [6]. Maternal mortality is a key public health issue, and the widest level of disparity in maternal mortality is between developing and developed countries. The lifetime risk of maternal death is defined as "…*the lifetime risk of dying from pregnancy related causes or the aggregate number of deaths due to pregnancy related causes over the female life course*" [7]. In developing countries this is one in 160 live births, whereas in developed economies, it is one in 3,700 live births [1]. Nepal is among those countries that report a very high maternal mortality ratio (190/100,000 live births) [8, 9], with teenagers experiencing an increased risk of complications and fatal pregnancy outcomes compared with older women [10, 11]. This thesis is focused on culturally appropriate methods of reducing maternal mortality in Nepal.

### 1.1.1 Nepal

Nepal is situated in South Asia between China in the north and India in the south, east and west (Figure 1.1). It is a landlocked country, with an area of 147,181 square kilometres [12]. The country has 3,830 square kilometres of water (rivers and lakes). Nepal's ecological zones run east to west about 800 kilometres along its Himalayan axis, and 150 to 250 kilometres from north to south. The country is divided into three main ecological regions: mountain (Himalayan), mid-hill, and plains (Terai). The highest point in the country is Mount Everest (8,848 meters) [13].

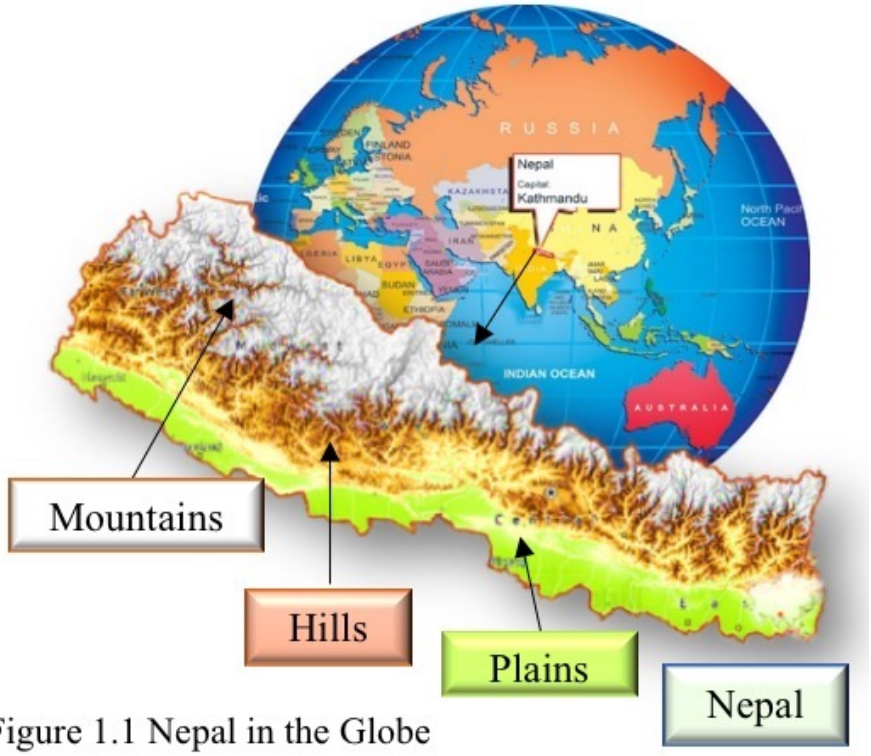



Figure 1.1 Nepal in the Globe

#### 1.1.1.1 Religion, culture and tradition

Nepal is a patriarchal society. Men usually go out to work while women are the homemakers. The religions practised in Nepal are as follows: Hinduism, Buddhism, Islam, Christianity, Jainism, Sikhism, Bon, ancestor worship and animism. The majority of Nepalese are either Hindus or Buddhist; the two religions have co-existed in harmony

for centuries. Hindus and Buddhists practice similar types of marriage norms and their rules of marriage are particularly relevant when considering maternal wellbeing. Traditional marriages are arranged by parents once they consider their sons and daughters to be ready for marriage. In rural villages, it is usual for the bride and bride groom to see each other for the first time on their wedding day. However, there are some opportunities where boys and girls are invited to see each other for a few minutes before the engagement (the Janai supari) process. This largely depends on how the parents would like to make the final decision for the marriage. A newly married woman goes to live with the parents of her husband. There are numerous social restrictions placed on a daughter-in-law. For example, she is expected not to talk to any strangers, particularly men. The daughter-in-law is expected to work, cook and feed others before herself, so she is likely to have little or no food, despite the hard and long hours of work. This poses serious challenges to the nutritional status of women and may increase the risk of pregnancy and childbirth complications. These social restrictions and expectations hinder women's access to proper nutrition, rest and care during pregnancy and childbirth.

The behaviour of any society is underpinned by the culture and tradition it possesses. Nepal has a rich, unique cultural tradition that has evolved over centuries. This multifaceted cultural heritage represents the diversity of Nepal's tribal, ethnic, social and cultural groups and is demonstrated in songs, dances, music, folktales, folklore, art, craft, literature, language, religion, philosophy, food, drinks, festivals and celebrations.

Singing and dancing are activities people practice every day in the rural areas of Nepal. There are numerous social events and festivals that are dominated by music and dance; for example, Rateuli and Tij are the songfests for women. These events are opportunities for women to express their enduring despair and suffering through songs. Nepalese women can express critical commentary through songs that would otherwise be forbidden

by their culture and can include a critique of domestic behaviour and family relationships. They also create songs to strongly criticize the nation's wider social and political issues [14].

Customs and traditions differ from one part of Nepal to another. For example, in the mountain districts where 2.4 million people (8% of national population) live, [15] singing may not be as popular as in the hill and Terai (plains) districts. In Kathmandu, the capital city, different cultural practices come together to make a national identity. Joint religious practices and celebrations of festivals by Hindu and Buddhist people are the most prominent factors of everyday life. Nepalese do not eat beef; the cow is the national animal of Nepal and is worshiped by Hindus. Furthermore, Nepal does not have a distinct cuisine: food habits differ depending on region. Nepali food has been influenced by Indian and Tibetan styles of cookery. The typical Nepali meal is bhat (boiled rice), dal (lentil soup), and tarkari (curried vegetables). People often prepare homemade achar (pickles) to have along with the meal. Normally the everyday diet is vegetarian, however, in the case of special events such as festivals and marriage ceremonies, curried meat is prepared as a special item. For pregnant women, the adequacy of the food in terms of quantity and frequency is a concern. A wide variety of food, and eating frequently during pregnancy, are essential to meet the nutritional needs of both the mother and the growing fetus. Diet during pregnancy influences the size and health of the baby [16].

#### 1.1.1.2 Tourism

Tourism is one of the mainstays of the Nepalese economy. The rich, ancient culture of the country, set among dramatic scenery, make it suitable for tours and expeditions. Nepal is an ideal tourist destination that presents world-class, authentic and unforgettable experiences. Nepal boasts an unmatched diversity that encompasses Terai (plains), and jungle, to the world's highest mountains. There are fifteen national parks and wildlife

reserves in the country; two are UNESCO Heritage sites. Nepal is among the last places on earth where the Asiatic rhinoceros and the Royal Bengal Tiger can be observed.

It has been said by tourists that the greatest attraction of Nepal is its people. The hospitality and the welcoming traditions of different ethnic background communities are something that makes a tourist's time in Nepal special. Nepal is known as the country of Mount Everest, the birthplace of Lord Buddha, and the home of the Pashupatinath Temple (one of the world's leading Hindu religious sites), which attracts many tourists and pilgrims. Tourism is a significant factor in improving the local economy [17] which is essential for improved nutrition and health care, and is especially important for women.

#### 1.1.1.3 Political and administrative system

Nepal is a republic with a multi-party system governed according to the Constitution of Nepal, which came into effect on 20 September 2015, replacing the Interim Constitution of 2007. Nepal was declared a secular country by Parliament on 18 May 2006 [18]. Two years later, the Hindu monarchical kingdom of Nepal was abolished, and a Federal Democratic Republic declared. This was the most significant institutional transformation in the modern history of Nepal [19].

Nepal is still undergoing major constitutional and institutional transformation. In March 2017, the country was divided into different administrative entities: Metropolitan Cities, Municipalities and Rural Municipalities. Further changes in the number of Cities were made on 1 June 2017 and there are now seven Provinces, six Metropolitan Cities, 11 Sub-Metropolitan Cities, 276 Municipalities and 460 Rural Municipalities in Nepal. The 77 Districts in Nepal are the second level of administrative divisions after Provinces. There are from 8 to 14 Districts in each Province. Districts are responsible for law and order and

the coordination all line ministries with district level institutions. A Chief District Officer (CDO), works under the Ministry of Home Affairs to coordinate these functions.

On 10 March 2017, the government of Nepal dissolved 3,157 Village Development Committees (VDCs) and announced the establishment of 460 Rural Municipalities (Gaunpalika) as the lowest administrative unit in Nepal. The VDCs were then converted into Wards of the new Rural Municipalities (Although Wards are now the smallest local government units in Nepal, these administrative changes took place during the study period, and therefore this thesis refers to VDCs as they were relevant when the project was undertaken).

Each district has several Rural Municipalities and they provide an extensive public-government interface. Rural Municipalities have the authority to collect various taxes like residential tax, business tax and entertainment tax at the local level. In a nation of villages, they are village-based administrative institutions. A Rural Municipality offers villagers the chance to organize village level meetings and develop local plans that are then discussed and finalized by the Rural Municipality Council. The Council makes sure that an equitable distribution of resources is made based on local needs and priorities.

## 1.2 Research area: Parbat District

The research undertaken for this thesis was conducted in Parbat district. This district is situated in the Western Development Region in the Dahbalagiri Zone bordering Kaski, Syangja, Baglung and Myagdi districts. It is one of the hilly districts with a population of 145,667. There are 35,698 houses in the district with an average household size of just over four people. It covers an area of 494 square kilometers, and the altitude varies from

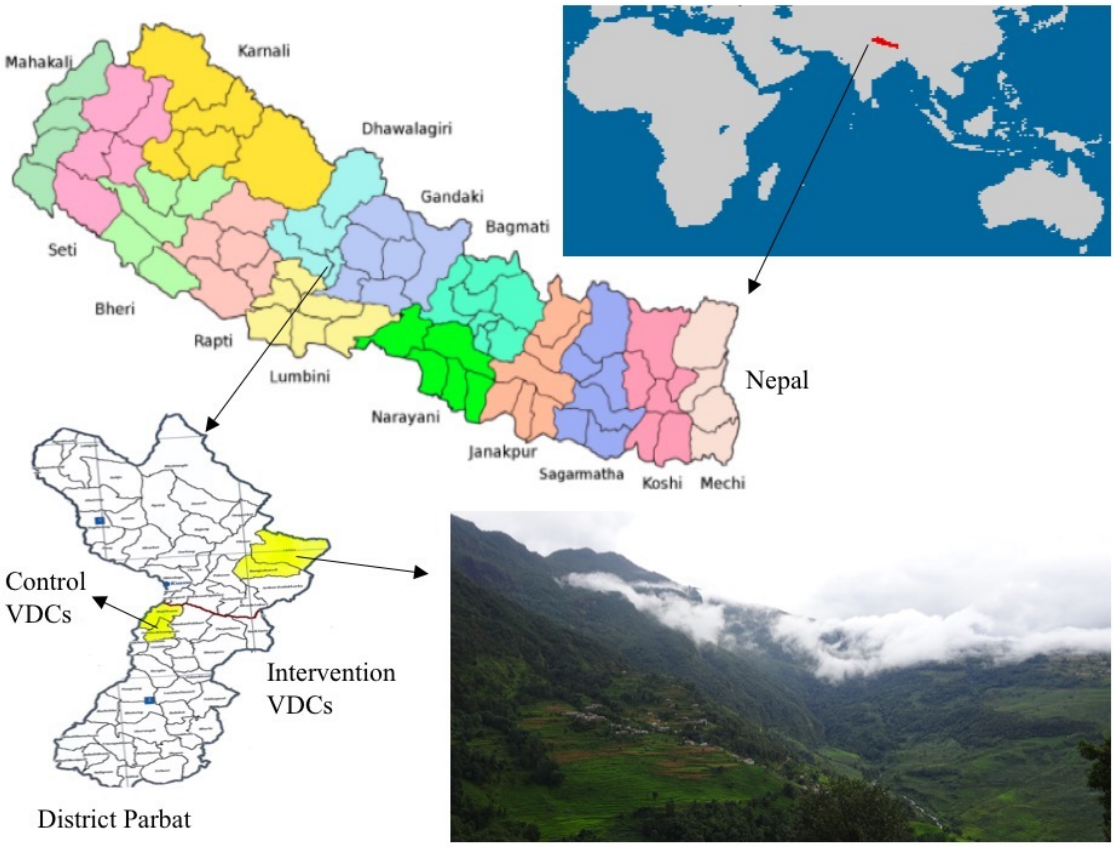
520 to 3,309 meters. The district receives an annual average rainfall of 2,500 millimeters, and it includes tropical, sub-tropical and temperate climatic zones.

The mountain communities in the North are influenced by Tibetan culture, as these communities have Chinese borders. Similarly, the communities of the plains in the South are dominated by Indian culture. Parbat is not influenced by any of these outer cultures and possesses its original culture. Its rural character, and opportunity to relate findings here to other hill districts, were the reasons for selecting Parbat district for research.

In March 2017, during the study period, several structural changes in political institutions took place in Nepal. Previously, Parbat district had one Municipality and 49 VDCs. This was changed to two Municipalities and five Rural Municipalities. As a result, the VDCs which are the subjects of this thesis were merged into the Modi Rural Municipality. The current situation is that the VDCs Ramja Deurali and Chitre are now known as Wards number 7 and 8, respectively, of Modi Rural Municipality. Similarly, VDC, Mudikuwa is now known as Ward number 4 and VDC Falebas Khanigaun as Ward number 5 of the Falebas Municipality. However, this thesis will continue to refer to the VDCs as they were before these structural changes.

### 1.2.1 Study clusters

Two adjoining VDCs were taken together to be an intervention cluster and two to be a control cluster (Figure 1.2), thus constituting a controlled trial. The selection of the clusters of VDCs was based on the distance from the district headquarters, rurality, economic situation and access to health services. Full details are provided in Chapter 3.




One of 18 intervention villages

Figure 1.2 Globe, Nepal, District Parbat, intervention and control Village Development Committees showing one of 18 intervention villages

### 1.2.2 Research villages

Ramja Deurali and Chitre Village Development Committees are situated in the North-Eastern border of Parbat district. Agriculture is the main source of income in the area, and rice, corn and finger millet are the main crops. Apart from agriculture, people find work by joining the Nepalese, Indian or British armies. There is one higher secondary school in Ramja Thanti and one high school in Chitre. There are a few feeder primary and lower secondary schools in the villages. After completion of secondary/higher secondary school, students must go to Tilahar (the adjoining village) or Kusma (the district headquarters) and Pokhara for further studies. Similarly, Mudikuwa and Falebas Khanigaun are in the southern part of the district. These villages adjoin the bordering villages of Syangja district. People grow rice, wheat, corn and finger millet.

## 1.3 Health system in Nepal

Primary health care was introduced in Nepal in the early 1980s [20]. Tertiary care hospitals are located in the capital city and in some of the regional centres. District health offices located in each district are responsible for the operation and management of curative and preventive activities. Health posts located at the community-level have a great deal of interaction with the people, and engagement in health promotion. These community-based health institutions were involved during the research intervention.

Almost two-thirds of health problems in Nepal are due to infectious diseases [21]. Epidemic outbreaks occur frequently with significant mortality rates. There are not enough health care workers in the country. It is also a challenge to retain health care workers at remote health facilities. The government of Nepal has encouraged the private sector to invest and complement human resource development and health care delivery. This provision has resulted in the establishment of a significant number of private hospitals, nursing colleges and medical colleges in the country.

### 1.3.1 Maternal health situation in Nepal

The maternal mortality ratio of Nepal is reported as 190 per 100,000 live births [9]. This figure is particularly high when compared with countries of similar socio-economic status, such as Pakistan and Bhutan. Although this national estimate is already among the highest in the world, the rural maternal mortality ratio is as much as double the national figure [22-24]. Amongst the rural areas, the western hilly regions have a higher rate of maternal deaths [25]. This is because health facilities are located so far away that people do not have access to them. There is also a lack of skilled assistance for childbirth and it is difficult to decide about when to travel to medical care. Even when a decision has been made to attend a health care facility, many women do not reach the facility in time due to

geographical challenges. In some cases, facilities are not ready to provide critical medical help because they are either too busy, or dysfunctional due to the lack of bio-medical supplies, electricity, water and trained staff [26].

On top of these factors, maternal mortality records are substantially underestimated as only deaths in hospital are recorded, making the situation more complex to address [22]. Furthermore, rural women are socioeconomically disadvantaged and deprived of education and have to endure multiple unwanted pregnancies and childbirth [27]. These complexities in Nepal are likely to confound efforts to improve maternal mortality. Although it appears to show a dramatic reduction in maternal mortality from 1990 to 2013 (Figure 1.3), the rural maternal mortality ratio remains double the national estimate due to the poor recording system [23, 24]. The national figures are therefore unreliable and may not accurately represent the rural situation.

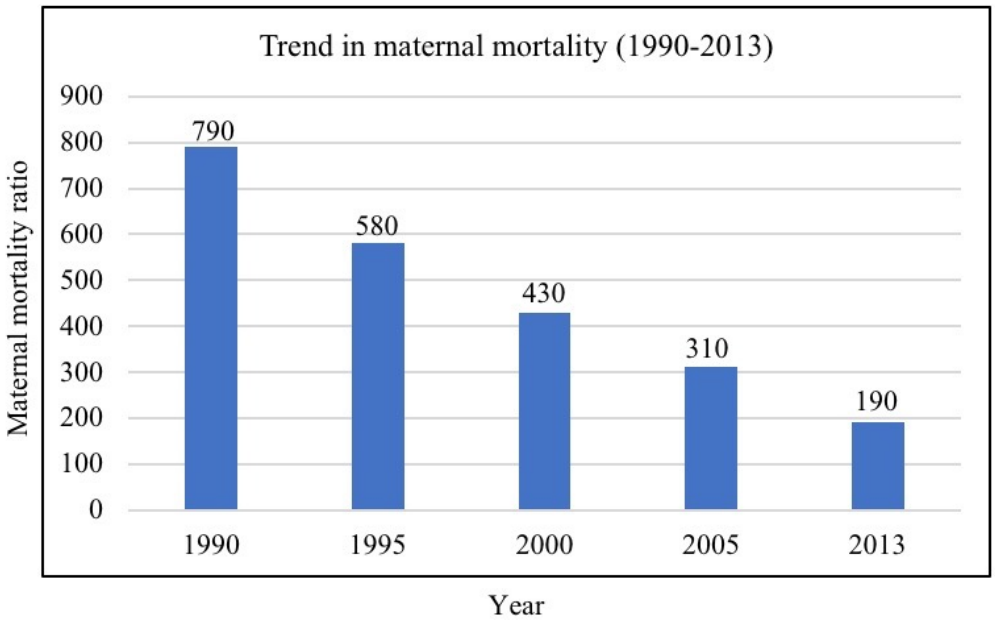



Figure 1.3 Trends in maternal mortality ratio, Nepal

Improvement in maternal health depends on several social, economic and health factors. Maternal health in a low resource setting is not only reliant on biomedical and technical factors but also has to be addressed through socio-cultural, behavioural, economic and

gender perspectives. Hence, to achieve improved maternal health and reproductive outcomes, a multi-component package intervention should be considered [28]. The intervention research undertaken for this thesis presented an approach to change behaviours to reduce maternal mortality from the grass-roots level using health messages transmitted to the whole community through songs created within the community.

## 1.4 Chapter summaries

Chapter 1 sets out a general introduction to Nepal including information on Nepalese religion, culture, tradition, tourism, and political and administrative systems, as these all impact on maternal mortality. Brief information about the research area, study clusters, and the maternal health situation in the context of the health system of Nepal is also presented.

Chapter 2 presents the current literature on maternal health with a focus on maternal outcomes in resource–poor settings and the methods used to address these problems. This chapter also describes the conditions in rural Nepal in relation to maternal health care and the suitability of the cultural media used to educate the community. Chapter 2 also explains the theoretical underpinning of behavioural change through education.

Chapter 3 presents the systematic review paper published (verbatim).

Chapter 4 describes the processes employed to develop the research plans and the methods used to execute these research activities.

Chapter 5A presents the intervention research video documentary, published along with the article in the American Journal of Obstetrics and Gynecology.

Chapter 5B presents a published eBook. Link: http://au.blurb.com/ebooks/654417-pathways-to-improving-maternal-mortality-in-remote-rural-nepal

Chapter 6 A reports the results published (verbatim).

Chapter 6 B presents the abstract published in the Reproductive Science.

Chapter 7 presents the review of Safe Motherhood Policy 1998, Nepal.

Chapter 8 presents a discussion on the implications of the findings, together with some anecdotal commentaries, experiences, and opinions from the local people. This chapter also presents the research implications and limitation of the intervention research.

Chapter 9 A presents the Policy Brief.

Chapter 9 B presents the conclusions of the study followed by references and appendices.

# Chapter Two
# Review of Literature

Chapter 1 provided some background information on the socioeconomic, educational, cultural and behavioral contexts of maternal death in Nepal. This chapter expands on that information and presents a critical review of the literature to identify the multifaceted determinants of maternal mortality in low-resource settings. This includes socioeconomic deprivation; culture and gender roles; the role and engagement of family and community during pregnancy and childbirth; the impact of these on health service access; and the theoretical basis of changes in health-seeking behaviour. The use of folk media for effective behavioural change and the opportunities to use singing as a means of communication in the study area are emphasised.

## 2.1 Maternal health situation worldwide

Maternal health is critical for improved maternal and pregnancy outcomes and maternal mortality is an important marker for maternal health. The worldwide annual maternal death toll of 289,000 (2013) [29] presents a serious challenge. Many maternal deaths are not recorded [30, 31] and women who suffer sustained complications and disability are also not accounted for. The estimated number of maternal deaths is therefore the tip of the iceberg of alarming maternal health problems [32, 33]. Maternal mortality ratios account for a small proportion of the overall maternal health problems [34-36]. Many women who develop obstetric complications may die if skilled interventions are not provided in time [37-39]. Even those who survive may sustain chronic complications leading to severe disability and morbidity [40]. This situation also results in poor family health outcomes and economic deprivation.

Quality maternal care is essential to prevent adverse maternal outcomes [41]. Maternal and foetal complications such as obstetric haemorrhage, pre-eclampsia, low birthweight, and prematurity are associated with poor utilisation of skilled antenatal care and care at birth [42, 43]. Maternal outcomes depend on the accessibility of services, resources, infrastructure and the referral system [44-50]. Quality care throughout pregnancy and childbirth is associated with good maternal and infant outcomes [51]. Researchers have confirmed that maternal outcomes also depend on the level of quality of the services provided. For instance, antenatal care, skilled assistance at birth and postpartum care have been found to lead to improved maternal outcomes [52-54]. However, antenatal care uptake in rural settings is dependent on social, cultural, economic and political factors [55]. Increased access to antenatal care, provision of skilled childbirth attendants and pregnancy care education programs at the local level contribute to safer pregnancies and childbirth [56]

Maternal health systems in low-income countries are challenged by numerous shortcomings such as a lack of skilled workforce, poor transportation and community education, and distance from health facilities [50]. Moreover, in such settings emergency obstetric services are unevenly distributed [50, 57]. These disparities result in poor access to care during pregnancy and childbirth, both of which are essential for improved maternal outcomes [50, 57-59]. Over a period of two and half decades (1990 – 2015), maternal mortality globally is estimated to have improved significantly from 385 to 216 per 100,000 livebirths (United Nations Inter-Agency reports).

Data indicate that antenatal care visits with a skilled health worker prevent maternal complications and mortality [54, 60, 61]. In a case control study conducted in Morocco, mothers who did not use antenatal care services had an eight times greater risk of maternal

complications [61]. Women who had frequent antenatal consultations had a reduced risk of maternal morbidity and mortality [62, 63]. Underutilisation of antenatal care services in Sagamu, Nigeria was associated with increases in the risk of adverse maternal outcomes [64] although other researchers in Senegal and the USA have found that antenatal care services have no association with maternal mortality [62, 65]. However, the reasons behind such disparate findings could be that to improve maternal mortality it is essential that not one, but a series of conditions be in place. For example, although antenatal care is one of the important factors in improving maternal mortality, it is also essential that other medical and non-medical variables (advance planning for childbirth, transportation, finance and the availability of trained staff and medical supplies) be in place to improve maternal outcomes. A small improvement in antenatal services alone may therefore be inadequate to improve maternal mortality. It follows that more effort is needed to devise strategies that address the wider sociocultural and economic barriers, in addition to system-related challenges [66]. This is especially the case given the socio-cultural and economic landscapes of low-resource communities.

Women in the developing world with poor access to health care and a low level of education have an increased risk of death from pregnancy-related complications [24]. Although the world-wide maternal mortality ratio seems to be improving, the mortality of women in rural areas of Nepal has not changed notably [23]. Determining the factors which are critically responsible and that need to be addressed to improve maternal mortality in rural Nepal was one of the aims of this literature review.

### 2.1.1 Socioeconomic deprivation and social standing of women

Socioeconomic factors, demographic factors, health service associated factors, and obstetrics characteristics, including the provision of maternal health care, have been associated with poor maternal and neonatal outcomes [67-78].

Complications during pregnancy, childbirth and after delivery are the leading causes of maternal death in resource-poor countries [79]. Poor social status among women in South Asian countries contributes to a lack of family planning and a rising population. This "feminisation of poverty" in the region is a fundamental anomaly that has impaired societal development [80]. Many sociocultural factors influence maternal death, including maternal age, early marriage, parity, birth spacing, family size and malnutrition [81]. Poor health care systems in developing countries have a direct negative influence on the health of women where reproductive health facilities are not available or are substandard [82].

In low-resource countries like Nepal, there are significant inequalities between rural and urban dwellers, and between the rich and poor, in gaining access to trained health workers during child birth [83-85]. The effect of social and cultural inequality is particularly noticeable in reproductive health, which affects not only the mother and child, but the future health of the population. When women are denied freedom and human rights within families and communities, their role in the public sphere becomes compromised. All mothers deserve the right to access skilled care and to be informed of their birthing options [86]. However, women in a resource-poor environment may not access the care they need unless family members realise their need and decide to seek care. Gender-based discrimination is present in both developed and low-income economies [87] and in South Asian countries like Nepal, violence against women is common [88].

### 2.1.2 Maternal survival is more than a health issue

The health and welfare of the family depends on the health of the mother [89]. The chronic illness or death of a mother increases the risk of death and illness in her children [90]. An increased number (estimated at 10-20 million) of women develop physical and mental illnesses every year due to poor management of pregnancy and childbirth complications [33]. Losing a mother is not just a temporary loss; its negative impacts are felt for years by the children, family and the society. Maternal survival is therefore more than a mere health issue. Improved maternal health is essential for the whole family, particularly those young children who are dependent on their mothers for primary care and support [91].

In a number of studies, it has been determined that maternal health services in developing countries in particular, are not designed to address the socioeconomic and cultural barriers of maternal health seeking issues [92]. To ensure tangible improvements in maternal outcomes, the planning and design of programs need to be suited to the local context. Priority must be given to the modification of medical and social dynamics encouraging freedom in health care seeking, participation in decision making processes and providing education to female children. Such interventions can substantially contribute to an improvement in maternal health and wellbeing [93]. For example, if a girl is provided with the opportunity to study, she could be empowered with the knowledge and skills essential for acquisition of a job. Upon being engaged in economic activities she will have access to much needed resources and a better environment for health seeking and further education.

## 2.2 Maternal health in Nepal

In Nepal, the majority of births take place at home [94]. Hence, most maternal deaths occur at home, and many remain unrecorded [30, 31]. One reason for this is that people consider death a private matter and find it inappropriate to discuss such traumatic issues.

Health care workers do not tend to discuss taboo issues such as death [22, 31, 95]. The poor-quality data and reporting system are other reasons for inaccuracies in maternal death ratios [96]. Despite such underreporting, maternal mortality in Nepal (190 per 100,000 live births) is one of the highest in Asia, and among the top ten in the world [97]. Although this national estimate has fallen over the last decade, in the more remote rural districts of Nepal the maternal mortality ratio is double the national estimate [98] making it 380 per 100,000 live births [99]. However, as most births without skilled care occur at home [100] and maternal outcomes are not registered [31, 95] the true figure for rural Nepal is likely to be much higher.

### 2.2.1 Sociocultural position of women in rural Nepal

In rural Nepal, people practice arranged marriage. After marriage the woman goes to live in her husband's house where she has limited rights compared to men and poor access to resources that are essential for her health and health seeking practices [101, 102]. For a woman in rural Nepal, performing household chores and maintaining a shy and silent womanhood is viewed as a higher priority than her own health needs. Women start work early in the morning and go to bed after all the cooking, feeding and cleaning are finished, yet their heavy workload and responsibilities are not recognised by family and society.

The unequal power relations between men and women are commonly observed in both the public and private environments [88, 103] and are an important determinant of maternal health [88, 102, 104]. When a pregnancy occurs, the family members, including the couple themselves, often prefer a son rather than a daughter [105]. This deep-rooted gender bias obliges women to continue becoming pregnant until they deliver a son. There is a saying in Nepalese society that the son will make the world shine but a daughter will run the kitchen [106]. Daughters and women in the family are fed after sons and men

[106, 107]. Even if a woman has a higher educational level than her husband, her status and identity is seen only within the context of her husband [101]. This poor social standing of women within the family limits their ability to seek help during pregnancy and childbirth and influences both maternal and child health outcomes [105].

Family education, income and sociocultural background also influence the health-seeking behaviour of pregnant woman [108, 109]. Even when the situation is life threatening, a female is still likely to be dependent even if the family are supportive [110, 111]. Different sociocultural factors and their interactions make pregnancy even more complex in rural settings where illiteracy rates are high.

Cultural issues, norms, shyness, fear during pregnancy, childbirth and postpartum, as well as dependency in terms of finance and decision making, pose great risks of death to pregnant women [31]. Restrictive norms include, for example, in some communities, the belief that pregnant women should not eat more than usual, as this may increase the size of the baby and may cause a difficult childbirth. In such contexts, community education interventions could play an important role in modifying nutrition and health-seeking practices during pregnancy and childbirth.

### 2.2.2 Planning maternal care

Mothers-in-law make the final decisions with respect to all pregnancy issues, childbirth, postpartum care, and child care [112, 113]. However, because women are excluded from financial affairs and decision-making [101, 102, 114], pregnancies in rural families often proceed without proper planning. This can cause maternal stress due to a lack of knowledge of potential complications and their management, and an inability to take part in decision-making [115, 116]. If women are to plan for childbirth, it is essential to

improve their access to finances and institutional delivery; this should be central to any health and financial strategy [117].

In rural families, money, food and other logistics have all been seen to have an important influence on maternal outcomes [118]. If the issues of pregnancy are not discussed and planned within the family, pregnant women are less likely to obtain antenatal examinations and skilled care at childbirth [119]. For rural families, the issues of money, food and other logistics are all significant [118]. Indeed, some researchers have concluded financial capability is the key to saving mothers' lives [120]. However, this is not necessarily true in the case of Nepal's remote areas as discussed in the following. Family members and the community could take a greater role in planning childbirth management and, to ensure the mother reaches a health care facility for delivery, prior decisions could be made about communication with the birthing facility and arrangement for transport to the facility.

### 2.2.3 Health infrastructure in rural Nepal

To ensure institutional delivery birth-preparedness, transportation, maternal waiting facilities and functional health facilities, including motivated trained staff, are essential [121]. Push and pull factors influence population settlement. In Nepal in particular, settlement is based on the location of pastures for livestock, and the availability of water and fertile land for agriculture [122]. Thus, unlike urban areas, rural populations are scattered and generally located at great distances from the limited health care facilities. Remotely situated health facilities lack not only crucial medical supplies but also essential technical staff. In such situations, health care and information are far beyond the reach of rural women [123, 124].

Nepal's health development challenges are exacerbated by its hilly geography that restricts transport and communication, particularly in rural regions [125]. Although there is a strong movement towards professionalising the skilled nurse-midwifery workforce that currently practices in Nepal through the Nepalese Midwifery Society, Nepal currently has no professional midwives [126]. In 2014, only 55.6% women had skilled care at birth with wide inequalities between the wealthiest (93%), and the poorest (25.5%) quintiles [127]. Such deficits in health infrastructure, and challenging geography, combine to create poor outcomes in maternal health [125].

### 2.2.4 Poor nutrition

Poor nutrition is considered to be one of the leading causes of maternal death in Nepal. The nutritional state of Nepalese women in rural areas is often poor. As a result, they may suffer severe anemia and other effects of malnutrition [128, 129]. Micronutrients (vitamins and minerals) have significant effects on the well-being of pregnant women and the developing fetus. In particular, anemia (iron deficiency) during pregnancy increases the risks of hemorrhage during childbirth, and thus death [130]. In fact, existing gender discrimination, and gender roles in food practices and priorities in villages result in pregnant women becoming more vulnerable to pregnancy-related complications and death. As nutrition is associated with the development of the pelvis, poor nutrition may result in a small pelvis and so lead to obstructed labor and even death [131].

Maternal deprivation distresses the health of the fetus, resulting in health challenges in infancy and into adulthood [132], and these adverse effects are evident in Nepal [133]. Nutritional intervention to ensure adequate ovulation, fertilization and placental formation needs to commence before pregnancy [134, 135]. Modern nutritional intervention includes multiple micro-nutrients to improve outcomes. However, in rural

areas in Nepal, interventions are inadequate and do not address nutritional problems. In addition, medical interventions have not been designed to address the unique situation of the rural population [136]. In order to achieve the desired improvement in the health and nutritional conditions of the rural population, programs need to address the socioeconomic conditions of geographically isolated communities. Unfortunately, given the limitations of the public health system, front-line health care providers are unable to address these essential issues [137]. Furthermore, preference for male nutrition over female nutrition exacerbates this problem.

### 2.3 Male involvement in maternal care

In the rural areas of Nepal, pregnancy, childbirth, postpartum care and child care is considered the responsibility of women [138]. Male family members are not sufficiently concerned with this issue [138] and there is almost no communication between fathers-in-law and daughters-in-law on pregnancy-related matters. A daughter-in-law is expected to hide her face from her senior male in-laws and men are often unaware when a pregnant woman is experiencing difficulties. Yet it is the men who usually control the family finances which might be needed to access care during pregnancy and childbirth [109, 139].

Although mothers-in-law commonly make decisions on pregnancy-related issues [112], permission must be sought from the male head of the household for any costs associated with seeking pregnancy care. As it is very uncommon for men to take an interest in pregnancy-related care issues, the resulting lack of communication limits women's access to pregnancy care [139]. Gender disparity and discrimination is common in South Asian countries like Nepal and is particularly prevalent in rural settings [140].

Seventy-five percent of women in resource-poor countries have obstetric complications that are associated with three main delays. Firstly, the delay in making the decision to seek care, secondly, the delay in reaching the health facility and thirdly, the delay in obtaining care at the facility [141-145]. More than half of poor maternal outcomes were due to the first delay, 4% due to the second and 20% due to third [146, 147]. Male involvement in maternal care can significantly reduce the first and second delays. During pregnancy and childbirth women are vulnerable to the impact of expenses incurred at birth [148]. The cost of taking a woman to a hospital for childbirth may push the family into long-term financial hardship [149]. Such financial hardship for the family may deter them seeking care in the future [150]. Even if it is decided to seek professional healthcare, the time taken to obtain money may lead to significant delays in accessing care [151] and if a woman has been taken to the hospital for childbirth, the anticipated medical and non-medical costs may force her to leave before she is ready for discharge [152]. These situations can lead to postnatal complications and increased risk of maternal death.

The involvement of men, therefore, is vital, as the decision making and management of delivery at a health institution - or by a trained attendant - requires a financial decision. The levels of male education and involvement are therefore critically important in seeking skilled assistance during childbirth [109] and can make a substantial difference to the lives of women.

The factors that might encourage men to be involved in maternal care include pride, recognition by men of the benefit of their involvement, advocacy, male champions and other incentives [153]. Similarly, the barriers to male involvement may include social stigma, and adherence to socioeconomic and cultural beliefs and practices [153]. In a patriarchal society like Nepal, the role of men can be very complex in sociocultural and traditional contexts and this may conflict with the public health recommendations from

more developed countries [154]. Some researchers have suggested that the involvement of the husband in maternal care needs to be prioritised, perhaps even more so than women's education and their status in the family [155].

Although there have been focused interventions (training and placement of skilled birth attendants (SBAs), the placement of SBAs and the supply of logistics for obstetric services [156]) and advocacy for safe motherhood for more than two decades in Nepal, these efforts have proved insufficient to improve maternal death ratios [157]. Further action is required to modify the male-dominated sociocultural, economic and educational environment of mothers in Nepal to improve maternal outcomes. The research undertaken for this thesis used culturally appropriate methods to include men in the care of women having children, in this case by the distribution of pictorial wall charts and singing health messages to promote safer pregnancy and childbirth to the community.

## 2.4 Maternal education is a key to improved outcomes

Maternal education is strongly associated with maternal outcomes [130] and mothers with higher educational levels have significantly lower risks of maternal complications [142, 158-160]. This may be because mothers with higher educational levels are more likely to use antenatal care compared to illiterate mothers [161]. In other studies it was concluded that maternal education has no relationship with maternal complications [162, 163]. Those results may be explained because in remote rural communities, most decisions related to maternal health are made by the family members, particularly males, and this is particularly true in rural Nepal. In such a socio-cultural environment, maternal education may play very little part in determining health seeking practices and responses to maternal complications. Furthermore, if a woman's status is not recognised in the family, maternal education may have no influence over the reproductive behaviour such as gravidity and parity [162].

Researchers have strongly emphasised the need for context-specific interventions to improve maternal health care in developing countries [111]. In Sri Lanka the maternal mortality ratio fell significantly from 55 per 100,000 live births in 2000 to 29 per 100,000 livebirths in 2013 [9] and the level of women's education was shown to have contributed to making these gains in reducing maternal mortality [164]. In another study conducted in Khartoum, Sudan, Hassan *et al*. have shown that maternal education is an important determinant to improve maternal outcomes [165].

Nevertheless, in studies conducted in Burkina Faso, Ghana and Sudan, maternal education was found to have no statistical significance in relation to neonatal mortality [166-168]. This may be due to women's social standing that can hinder access to resources and decision making resulting in inadequate care during pregnancy, childbirth and postpartum. Although the issue of gender inequality has been cited as a hindering factor in low-resource countries, particularly in Nepal, little effort has been made at understanding how status measures such as education, socio-economic and cultural factors may have hindered women in seeking health care [105]. While gender-based practices may have played an important role in poor health outcomes, a weak health system and geographically inaccessible health facilities may also have a combined effect on the poor outcomes [169, 170].

## 2.5 Maternal survival in developing countries

There are a series of links to be considered in the maternal survival chain including education, cultural norms, geography, economics, distance and infrastructure (Figure 2.1). All must be dealt with in a timely and appropriate fashion to save mothers during pregnancy, childbirth and the postnatal period. Inadequate or individual changes may not significantly reduce the risk of maternal death. For example, in an Indian state, Uttar

Pradesh there was an attempt to reduce maternal mortality by improving the adherence to a check-list by skilled birth attendants [171]. Although an improvement in the use of the check-list was recorded, there was no evidence of improvement in maternal and perinatal death, or severe maternal complications within 7 days after delivery. This demonstrates that it is just as essential to consider the specific situation of mothers as it is to improve the skills and performance of skilled birth attendants. The pathway between pregnant women, their economic, geographic, social conditions, other potential barriers and the survival of mothers and babies may be viewed as a series of links in a chain, with outcomes dependent on the strength of the weakest link. The results of the Uttar Pradesh study do not mean that high quality skilled birth attendants are not important; they merely indicate that if a woman arrives late to a facility because of earlier weaknesses in the chain, or if high level care is not rapidly available, then the outcomes will remain poor. The need is to ensure an effective supply chain from conception until the postpartum. No matter what specific change and improvement is made at any specific stage, unless each link (stage) involved in the maternal survival chain is made stronger, improvements will be limited: the chain is only as strong as its weakest link.

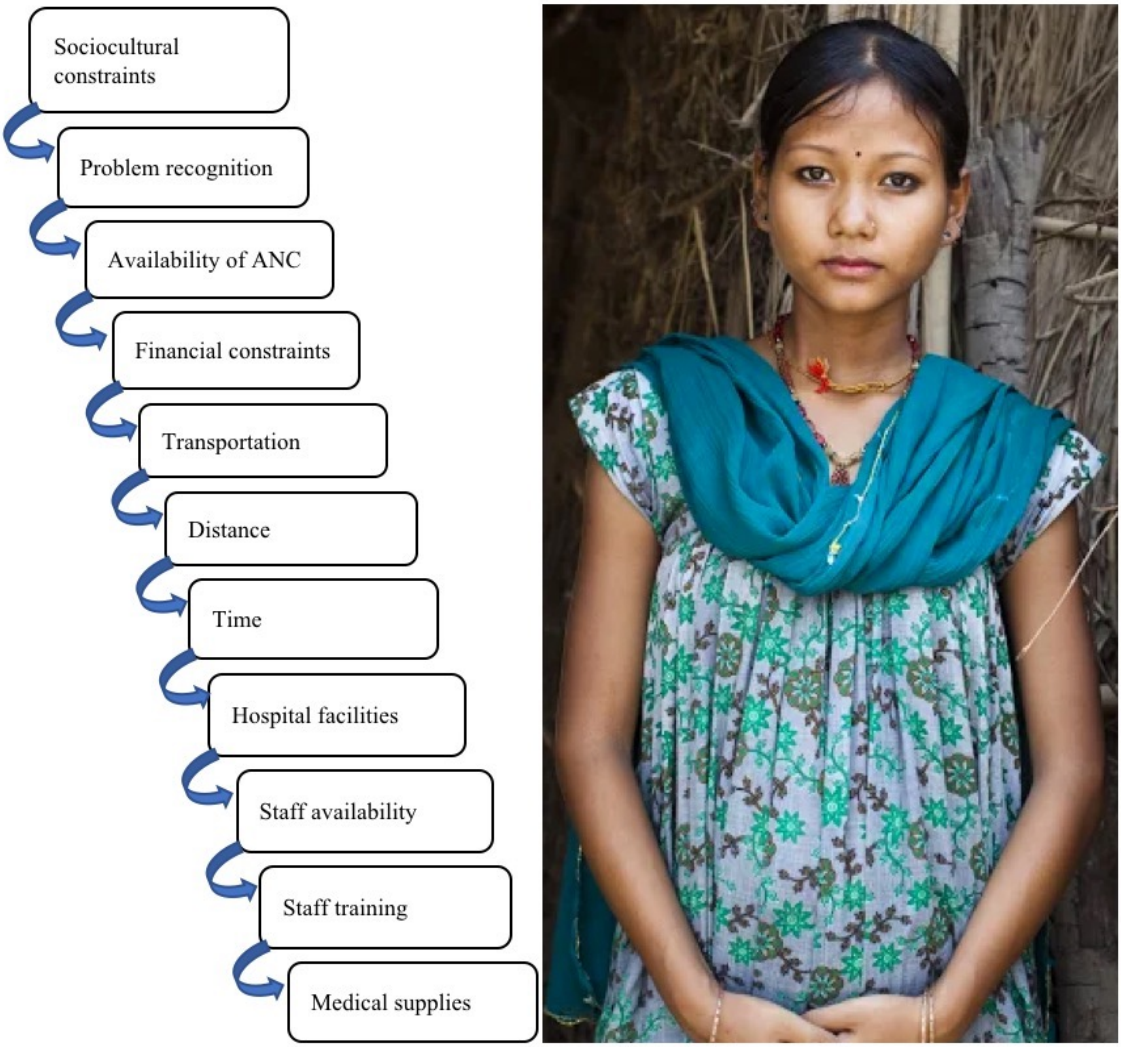



Figure 2.1 Barriers to overcome in order to survive giving birth in rural Nepal

For women to survive childbirth in remote areas, the following are the key links (figure 2.1): the resolution of sociocultural constraints; the recognition by the woman and her family that effective care including nutrition and care within the family will improve outcomes; the availability of antenatal care, the commitment of the family to avail themselves of delivery by a skilled birth attendant; and the provision of financial resources to access skilled care and care at a higher level in case of emergency. Several links require that health facilities are in place: for example, hospital facilities, the availability of trained staff, and the availability of medical supplies. If any of the links in the chain are defective, then the woman and her child remain at high risk of death.

### 2.5.1 Family and community support

Family and community preparedness for safer pregnancy and childbirth helps minimise delays in decision making and management in accessing skilled care [108]. Given the multi-faceted barriers to accessing maternal health care, the question is how to make families and communities responsive to pregnancy. Improved community mobilisation supported by a functional district health system can result in significant improvement in maternal health [79].

Health care interventions are often limited to a rigid and structured operational framework rather than being designed to meet the socio-cultural and economic realities of the communities they serve [172]. National programs and strategies often fail to consider the hardship imposed by distance and lack of infrastructure that is peculiar to people living within rural settings [173].

Researchers have shown a significant level of reduction (37%) in maternal mortality where the community, and women in particular, are empowered and engaged in maternal health management issues [174]. When considering the education of rural populations, it is equally important to advise planners on how rural health care ought to be designed. Unless plans and strategies are aimed at suiting the socioeconomic, cultural and geographic contexts of rural population, the health care system will continue to be underutilised.

The limited autonomy of women in developing countries is a major barrier not only to accessing care during pregnancy, but also to ensuring good reproductive health [175, 176]. It is therefore important to understand women's contextual circumstances while planning programs for their reproductive wellbeing. Unless households and communities

are aware of the harmful impact of gender roles and practices, women's lives will continue to be at risk. Moreover, the services instituted for them will remain largely underutilised and, despite national efforts, it will be challenging to achieve the reduction in maternal mortality set by Millennium Development Goal-5 "Improve maternal health" (Reducing maternal mortality ratio by three-quarters between 1990 and 2015). An increase in the number of births attended by skilled health personnel is one of the indicators of this goal [124]. Countries that have successfully reduced maternal mortality to the level of less than 100 per 100,000 livebirths, have increased skilled attendance at delivery to a greater extent [177].

### 2.6 Sustained behaviour change

Many factors of the chain to maternal health rely on individual behaviours. In order to address behavioral issues and modify them to improve health practices, a comprehensive understanding of the respective population is essential. A concern of preventive medicine is to change the behaviour of a population for improved health. Obtaining behavioural change is often viewed as a complex issue. The retention of changed behaviour so that it becomes a habit, is also a challenge [178]. Methods used to modify behaviour are often based on fear, punishment and the risks related to certain behavior. Although fear of punishment and perceived risks may work in some situations, they are likely to contribute to a reluctance to change [179]. Behavioural modification should instead take place through information-based desire and intention. The best results are achieved when researchers and health workers with knowledge of local cultures and situations help to develop and test the interventions [179].

There are ways to create "teachable moments". A teachable moment is an opportunity for care providers to create an environment through deliberate interaction to encourage

clients to learn on the health issue of interest [180]. Physician-client interactions for example, can create "behaviour changeable moments". Interactions with pregnant women and their family members can improve health seeking behaviour, particularly during pregnancy. Once the benefits of the new behaviour are understood in the local context, people can take ownership and leadership in practice. Thus, healthy behaviours are likely to be regenerated and sustained. It has been observed in pregnancy education that there was an 83% improvement in sustained behaviour after advantage had been taken of a "teachable moments" compared with only a 49-74% improvement before "teachable moments" were utilised [181]. For example, any information provided to a woman to improve pregnancy behaviour may be effective if provided while she is pregnant; this would be the teachable moment for her to learn and practice.

The behaviours that are essential in certain conditions, pregnancy for example, include health seeking such as antenatal care and good nutrition practices. During pregnancy, women can be apprehensive about their own health as well as the growth and development of their babies. Any pregnancy carries potential risks and can result in fatal consequences without any prior medical warning. Women who are aware of the risks are likely to visit health care providers more frequently. The opportunities for interaction on specific health issues makes pregnancy the most "teachable moment" for long-term behaviour change related to maternal health [182]. Health care providers need to be aware of these opportunities. Interventions need to include innovative program design, appropriate technology and be low cost if they are to be effective and sustainable [137].

## 2.7 Mobilising Female Community Health Volunteers (FCHVs) for community-based interventions in Nepal

Female Community Health Volunteers form the grassroots foundation of Nepal's community-based primary healthcare system and are the key links between health services and community members. The successful community mobilisation for the National Vitamin A program in Nepal is credited to the role played by the FCHVs at the local level [183]. They have been given basic and refresher training on reproductive health, maternal health, child health, communicable diseases and other health-related issues such as communication and community services. The trust and respect they have gained for their volunteer services in the community makes them a potential resource for community transformation [184]. Although they are unpaid and they have other (family) responsibilities, their dedication towards community service (five hours a week) has made them a credible source for community education programs [185].

Since all FCHVs are invited to be a volunteer while they are serving as a member of a women's group, they are a potentially sustainable form of mediation with these groups, which focus on pregnancy, childbirth and the newborn period, and which could result in a substantially increased level of education in the community [186]. However, the targets for maternal health issues in pregnancy, and childbirth related preparedness in particular, are yet to be achieved. In order to bring about desired changes in health-seeking behaviour in the rural context, messages transmitted through singing could be an effective strategy [185].

## 2.8 School-based programs

Schools have the potential to make a significant contribution to educating the community on any specific health issue [187]. Some health care/promotion programs have been based

in schools. For example, school-based interventions have included preventing / reducing risky sexual behavior [188] and the prevention and treatment of obesity among children and adolescents [187]. There have been a number of studies of school-based programs, for example, "Reducing suicide potential among high risk youth: Test of a school-based intervention program" [189] and "A meta-analysis of school-based smoking and alcohol use prevention programs" [190].

There is evidence that school-based interventions are more effective when parents are involved. For example, a school-based intervention in Minnesota to detect changes in the consumption of sodium and dietary fat, where the participation of parents was notably high (86%), resulted in increased knowledge among students about the subject [191]. Information imparted through students will affect their own future behavior and may help students, schools and the community develop positive relationships for further communication [170].

### 2.9 Use of media in health promotion

The approach to health promotion is changing as the concept of health education shifts towards the concept of health literacy [192]. For centuries, entertainment media such as drama and singing have been used for the presentation of information, instruction and communication. We could not find any evidence that entertainment media had been used as health promotion tools in rural Nepal. However, entertainment media have been used to provide health information elsewhere. For example, in America, television is the second top source of health information after health care providers [193]. A few studies have concluded that entertainment media plays an important role in educating people. The use of "edutainment" for development issues, has been practiced over the last few decades [194]. Researchers have shown that the improved level of education gained through

entertainment is popular, personal, persuasive, pervasive, passionate and profitable [195]. Many developing economies have benefited from the use of entertainment media for development and social change [196]. Some of the media used to promote educational awareness of development issues are discussed below.

### 2.9.1 Radio

One in every three people worldwide have access to radio [197]. In poorly resourced settings, radio is an important and reliable source of information. The development and management of radio programs is cheap, quick, and reproducible; hence, it is a viable medium for rural communication. It has been indicated that the Perkins' radio soap operas in Jamaica are popular amongst its audiences and effective in achieving a wide range of educational goals [198]. Similarly, in Indonesia, a radio soap opera entitled "Butir Pasir Di Laut" ("Grains of Sand in the Sea") has been effective since the late 1970s in promoting education on the importance of family planning [197]. In the United States a popular radio soap opera "Tres Hambres Sin Fronteras" ("Three Men without Borders") targeting Latino migrant workers, was effective in spreading the message about AIDS [199]. Over the last two decades, a radio talk show in Costa Rica "Dialogo" ("Dialogue") has successfully raised the level of education of the importance of sex education [200].

### 2.9.2 Television

In recent years, information provided via entertainment on television has had a remarkable impact in low resource countries in particular. The number of television viewers is increasing every year. The television audience in China and India alone is more than 1,000 million people [199]. One characteristic of television viewers is that they like programs such as soap operas [201]. These are the most watched programs both in Latin America and in Asia [202]. An entertaining religious television serial entitled

“Mahabharata” has more than 300 million viewers worldwide [203]. In India, the long running television program entitled “Hum Log’ (“We, Everyone”) created mass education on different social issues such as gender discrimination, family harmony, cultural respect and national unity and has resulted in positive social outcomes in society [199]. Similarly, the number of television viewers in Nepal is increasing every year. An estimated 76% of households own a television [204].

### 2.9.3 Music

Music can play an important part in behaviour change. From 1982 to 1986, a family planning communication campaign in Jamaica, which included a popular song, "*Before you be a mother, you got to be a woman*," was used to promote responsible sexual behaviour. It was sung by Gem Myers and the Fab Five, a Jamaican reggae group. The song attracted a large teenage audience and led to positive health behaviour. Similarly, in Spain in 1986 an edutainment project targeting contraception and sexual abstinence was launched. Two music videos entitled "*Cuando Estemas Juntos*" ("*When We Are Together*") and "*Detente*" ("*Wait*") were produced. One of the songs, “*Cuando Estemas Juntos*" was number one in the pop music chart for six weeks after its release in Mexico [199].

### 2.9.4 Film

Over the last few decades, filmmakers have become more interested in producing films aimed at community education. In the United States of America for example, Randall Frederick has made films on issues such as drug dependency, alcoholism and substance use, aimed at raising levels of public awareness [205]. Similarly, John Riber has produced many educational films in Sri Lanka, Uganda, Zimbabwe, Bangladesh and India

addressing issues such as family planning, AIDS, the status of women and oral rehydration therapy [199].

### 2.9.5 Local entertainment media

Messages imparted through local entertainment media can have multiple effects on positive behavioural change [196]. This method of message dissemination addresses the range of sociocultural aspirations of cultural regeneration. However, care must be taken when designing health interventions in communities where sociocultural norms, values and perspectives are shared. It is essential to consider such aspects through the perspective of communities in order to identify what health means to them, and by asking how they define their behaviour in relation to improving health [206]. Entertainment media such as drama, street plays, singing and dancing and theatre can gain the full attention of people. Messages developed and disseminated through these media may have an immense influence on public opinion and practices [207].

## 2.10 Folk media to create behaviour change

Folk media are rooted in the daily lives of a community and play such a dynamic role in motivating people that the use of these social assets for development is essential. The use of traditional folk media that includes both the emotional and physical participation of the community is an effective approach to behavioural change [208]. The combination of music, dance, pantomime, ballad recitation, festival pageantry and culture in the message brings people together. Besides promoting social values and the local identity, folk media play a significant role as instruments of interpersonal, interfamily and intercommunity communication. The importance of such programs has been understood and practiced in India. The First Five-Year Plan recommends communication with rural communities through traditional folk media. This initiative institutes a sustained system for

development communication. The spontaneous involvement, organization, and utilisation of their own life histories and experiences gives local people a sense of "we" [209].

Folk media can strengthen the ability of communities to address and respond to issues and problems [210]. The effective use of folk media is more significant in illiterate and financially deprived communities than in urban settings.

Often people in rural areas are poor and extremely busy, occupied with survival. Folk entertainment has a great impact on their lives. In fact, the mixed methods of performance attract people to the programs. This process helps develop creativity among people as they design, develop and give performances about heroism, humor, fantasy and the different themes that touch local lives. This wealth of communication may be blended with development messages as a systematic approach to community education. This is particularly effective when traditional folk artists and local youth are engaged [211].

### 2.11 Scope of application of folk media for development

More than 50% of the world's population live in rural areas [212]. In low resource and remote settings, where access to modern media is limited, folk media present an ideal opportunity to deliver messages and involve the community in the dissemination of these messages to the population [208]. Mass media, such as television, newspapers and the internet, are readily accessible in cities but less so in rural communities. Although communication has changed significantly over recent years, a large proportion of the world's population still use folk media for entertainment and transmitting messages, thus preserving its relevance for local communities. In country settings, folk art is a fundamental component of community living. Changes in people's beliefs and perspectives are essential for sustained change for development.

Consequently, it needs to be acknowledged that folk media can have an enormous influence on behavioural change communication within rural communities. When efforts are made to change community behaviour, communication through folk media has consistently played a significant role [199]. For example, after the World Health Organisation declared in 1988 that polio should be eradicated by the year 2000 [213], concerted and united efforts were made to eradicate polio utilising folk media [214].

### 2.12 Folk media in Southern Asia

Community education through traditional folk media is an ancient cultural tradition in southern Asia. Popular folk music and theatre are powerful tools for making emotional appeals for behavioural change in rural settings [208]. Music, dance and drama are integral to communication between people in Indonesia, the Philippines and India. In the past, folk media was used in these countries to spread messages of resistance against colonial rule [215].

In India, folk media has played a significant role in sociocultural transformation. People respect and practice music as a true and spontaneous carrier of local history and culture. Folk music has an immense influence over people's beliefs and behaviour. Accessing hard-to-reach areas and marginalised communities is a significant challenge. A sustained media campaign plays an important role in reaching the most remote areas. In India and Pakistan, in particular, hard-to-reach families in rural communities and poor and marginalised populations were accessed effectively to educate the community on Polio eradication measures using folk media [214].

Traditional folk media in India for example, played a substantial role in the social and political awakening campaign organise by Mahatma Gandhi, and folk performance art

was used continuously even after independence [216]. The importance of folk media for social and political awareness was recognised by Jawaharlal Nehru who said “I am greatly interested in the development of a people’s theatre in India. I think there is a great room for it, provided it is based on the people and their traditions. Otherwise it is likely to function in the air. It is a people's approach. Nevertheless, I think an effort should be made in the direction" [217].

In the Philippines, folk media is more cherished and considered more credible than mass media. Valbuena notes that Asian counties, through the use of folk media, can achieve their ambitions for development [218].

An Indian non-profit organization utilised the skills of the Bauls (a group of itinerant folk singers) along the India-Bangladesh border to impart messages on family planning, immunization and other public health issues as well as improved farming methods. The message contained in song and performed in villages was significantly effective (Mukhopadhyay, 1991; Singhal, in press). Rural Indian villagers in Madras enjoyed and benefited from the health messages disseminated through puppet shows and street plays. Messages on social issues such as dowry, death, corruption, and class and gender discrimination were effectively imparted through drama and street performances [219].

In Thailand, the Philippines and Indonesia, folk media was found to be very effective in creating awareness among rural people on health, environmental and conservation issues [220].

Similarly, drama in Nepal has been used to demonstrate people’s disillusionment with the government. After the democratic movement (1990) in particular, drama that included many other folk media flourished and had a unique effect on the peoples’ lives as it gave them freedom of expression. The decades-long autocratic political system suppressed

people's free speech, but through drama, their despair could be expressed [221]. In the rural context, although digital technology is not a part of life, students are interested in learning about new technologies such as mobile phones and computers [222]. This interest can be taken advantage of, with health messages designed to be disseminated through songs that can be played on mobiles, which would be an effective means of spreading messages across families and communities.

Women are typically more active in community-based folk media interventions. Their level of education in the process of imparting health messages therefore plays an important role: the more women become educated, the more effective will be the message design and delivery [223]. However, the issue of women's education in the gender and socioeconomic context of deprived communities is a challenge.

A bottom-up approach must be considered if the aim is to change the behaviour of society. Such approaches integrate the methods used to ensure enabling situations with contextual issues to produce 'communication for social change' [Background paper for communication for development round table, London: Panos Institute; UNFPA (2001). Applying folk media for development communication is a way of approaching people and valuing them as agents of change rather than objects of change. The use of local means of communication has multi-faceted benefits and signifies moving towards supporting dialogue and local ideas on the issues of interest, in contrast to going to people to deliver messages. It is an essential method to shift away from a focus on individual behaviour, towards a focus on social culture, norms, beliefs, values and supportive environments. Organizing development communication through local media is a valid approach. It moves towards offering ownership through partnership and negotiation, in contrast to persuasion. This approach helps local people incorporate their own cultural

norms and values in the program and to measure their achievements in their own social context [224]. These approaches have far-reaching behaviour change implications grounded in cognitive theories such as the AIDS risk reduction model (AARM), [225] theories of social learning [226] and the theory of planned behaviour [227].

### 2.13 Opportunities for using cultural media in rural Nepal

In rural Nepal, folk media plays an indispensable role in family and community culture. However, this has not been used for developmental communication [228]. It was felt that utilising folk song, street drama, poetry and puppetry could be valuable in achieving development goals. Use of these media is important not only to enhance people's level of knowledge, but since such media are low cost, locally accepted and, most importantly, do not presuppose any level of literacy or require modern technology, they are unparalleled community resources for message dissemination. In Nepal, there are distinct opportunities to use songs to educate the community on specific issues affecting local women [14].

### 2.14 Singing is culturally accepted in Nepal

Singing is a prominent feature of everyday rural life in Nepal. People take every opportunity to sing and dance in different religious festivals. In Nepalese culture, a community meeting or feast is considered an opportunity for entertainment [229]. Most festivals carry some sort of singing and dancing components.

This type of community environment is conducive to organizing singing programs with the help of mothers' group members, volunteers, youths and students. Community health volunteers and the school community in particular, are credible sources in the community which may be used to disseminate health messages. The reproductive health issue is one

of the gender health issues faced by the women in Nepal. It was therefore appropriate to engage both males and females in the community to spread messages on the role of family and community during pregnancy and childbirth using songs. There are several different forms of singing in rural Nepal and the main forms are described below.

### 2.14.1 Traditional (Gandharba) singing

The Gandharba is an ancient community of minstrels, frequently mentioned throughout Nepali history, who sing and dance to entertain the Gods. Gandharba singing is famous in Nepalese societies. One or two people perform the songs, mostly house-to-house and in small towns. They create songs which explore history, war, victory and the household relationships where they perform. Performers are usually male. The Gandharba's ability to sustain their musical tradition is weakening and their key musical instrument, the sarangi, is increasingly claimed by other (caste) groups [5]. Similar types of singing and storytelling on the theme of the social and economic suffering of the people occur in India [230].

### 2.14.2 Dohori

Dohori are Nepali folk songs. Dohori means "from two sides" or "an argument". This debate is performed in rhyme and includes swiftly delivered, humorous poetry. The two groups of players in Dohori typically comprise boys in one group and girls in the other. The song is initiated with a question, generally from the boys' side. One of the girls follows with a rapid answer and this continues the melodious dialogue. Dohori songs can last for as long as a week [231]. In recent decades, Dohori has become one of the most popular means of social communication through cultural entertainment in Nepalese society. Dohori is part of the rural courtship backgrounds of various ethnic groups and has become characteristic of Nepali national identity. Dohori is means for people to

address changes in their everyday lives, as well as participate in the evolution of culture of the communities in the rural hills of Nepal [232].

### 2.14.3 Bhajan

A Bhajan is any type of devotional song. It has no fixed form; it may be as simple as creating a song using local lyrics. The song is typically lyrical, conveying love and praying to the Gods. Through Bhajan, musicians express devotion and emotions including love and desire [233]. In Nepal, Bhajan are popular in rural communities. Typically, Bhajans are performed at the end of religious functions at the community or family levels by a traditional group of Bhajan singers.

### 2.14.4 Tij

Tij is a festival celebrated by women, for the long life of their husbands and a long and strong relationship between spouses. Tij is performed to promote marital happiness, the well-being of spouses and children and the purification of the woman's own body and soul. Tij is the most famous festival among Nepali women. The folk music and dances add richness to the traditional values of Tij. It offers a shared stage for women and has become a festival for female bonding. It allows women to be involved in the community and to enjoy womanhood [234].

There are numerous social events and festivals that are dominated by music and dance; Tij for example, is a Nepalese women's songfest [235-237]. Singing songs is an important opportunity for women to get out of the house and express their suffering. Nepalese women can express critical commentary through Tij songs (songs only the women sing) that would otherwise be forbidden by their culture, and these can include a critique of domestic behaviour and family relationships. The songs' lyrics may include a woman's

lament, melancholy but in defiant tones, particularly in relation to her in-law's family. As an example, some verses are shown below:

*"Not to die at one's birthplace is the fate of daughters"*

*"At the yearly Tij festival when my father doesn't come to fetch me,*

*My heart shed tears like a monsoon rainfall"*

*"You gave me away to be someone's second wife,*

*Father, how you dictated my fate"*

*"I am told by my in-laws not to consume their wealth like an evil person,*

*A twisted rope binds my waist"*

*"I will sit on the porch after cutting grass'*

*"Whose face will I look upon before going inside?"*

*"If I look upon my lord (husband's) face,*

*I feel just like a monkey that's eaten salt,*

*If I look upon my mother-in-law's face, I feel just like a burning fire"* [235]

Women also create songs to strongly criticize the nation's wider social and political issues. With the help of Tij songs, women are not only performing rituals but also voicing the gender inequality common in the family and in the society [14]. It is an accepted aspect of Nepalese society to communicate messages through songs. Singing is an important method of communication, particularly in rural settings.

### 2.14.5 Rodhi

The Gurung community have an historic tradition of Rodhi where young people meet, sing and dance to folk songs, and share their views. Young men and women at Rodhi often sing call-and-response songs called dohori, which are largely improvised. Rodhi is a form of systematised female association, with its origin coming from the practice of

girls and women meeting together to do their weaving work. In the course of this work, they sang, and boys joined in with musical instruments [238].

### 2.14.6 Rateuli

Rateuli is a women-only event organised during a wedding in the groom's house, during which time male members of the house, relatives and male neighbors relocate to the bride's house. Rateuli is entirely the domain of women. No males can participate. If any man is found, he is subjected to insults until he leaves. Through singing and dancing all female relatives of the groom, and women from the local area, make fun of heterosexuality and sexual interactions by impersonating male roles and attitudes [239].

### 2.14.7 Panche (Naumati) Baja

Panche (Naumati) Baja are sets of nine different musical instruments played at weddings and auspicious ceremonies. Since ancient times, Naumati has been played to promote good luck. Often, the Panche Baja's main role is to lead a procession. For example, the Naumati musicians play and lead the procession from the bridegroom's house to the bride's house and then return [240].

### 2.14.8 Deusi Bhailo ('wish singing')

Deusi Bhailo is a program organised during the Tihar festival and involves singing and dancing in individual houses. Typically, it is used to collect money for fun (picnic or tour programs). However, if there is fundraising for any social cause or project, the program goes beyond the designated days of the festival. Tihar is observed for five days. The crow, dog, cow, ox and brothers are worshipped, one per day. On the day of the cow (Laxmi Puja) people enjoy gambling and playing Deusi Bhailo [241].

### 2.14.9 Singing during Parma (reciprocal exchange of labor)

The Parma is a village-based reciprocal labor exchange system. During the labor-intensive season, once some of the villagers have completed the harvest or are not ready to cultivate or harvest, they may share their labour with neighbors in need. This is reciprocated when help is required [242]. Women make a group of Parma for agricultural work (cultivation and harvest) and men share their labour constructing houses in the village, cutting firewood and ploughing. When women are working in the Parma, they sing songs. This is one of the best opportunities to disseminate health messages to women, through women.

## 2.15 Systematic Review of Community Participation Interventions to Improve Maternal Health Outcomes in Rural South Asia

To comprehend the issues involved in community based interventions, a systematic literature review was conducted (published and included in chapter 3) to compare the effectiveness of interventions to promote family and community participation in maternal health care against standard health care and health service led programs on the outcomes: indicators of maternal health care knowledge improvement, maternal health care utilisation (antenatal care, facility birth, skilled birth attendant use), and maternal mortality in rural-remote regions of the South Asian countries, Bangladesh, India, Nepal, and Pakistan. A number of major electronic databases were searched in the process of review. 11 randomised trials were included from 5,440 citations. Three community intervention subgroups were identified (1. Community mobilisation, 2. Community education, and 3. Women's groups) for improving maternal health outcomes.

The level of care throughout pregnancy and childbirth is associated with good maternal and infant outcomes [51]. Antenatal care uptake in rural settings is dependent on social

and cultural factors [55]. Increased access to antenatal care, provision of skilled childbirth attendants and pregnancy care education programs at the local level contribute to safer pregnancies and childbirth [56]. In rural families, money, food and other logistics have all been seen to have an important influence on maternal outcomes [118]. Although mothers-in-law commonly make decisions on pregnancy-related issues [112], permission must be sought from the male head of the household for any costs associated with seeking pregnancy care. As it is very uncommon for men to take an interest in pregnancy-related care issues, the resulting lack of communication limits women's access to pregnancy care [139]. Gender disparity and discrimination is common in South Asian countries like Nepal and is particularly prevalent in rural settings [140].

## 2.16 Theoretical bases for health promotion

Despite significant advancements in health care technology, human behaviour remains one of the largest sources of variance in health behaviour change outcomes (as cited Schroeder 2007) [243]. This knowledge forms the theories (Community Organization Model, Social Network Theory and Health Belief Model) discussed, which are brought together in efforts to creating awareness in the rural community setting. Interventions can be designed and developed to address the modifiable behaviour pattern of the individual, group and the community. Basically, these theories offer frameworks for effective planning and design for an intervention.

### 2.16.1 Community Organization Model

The Community Organisation Model (Figure 2.2) aims to empower people to improve and maintain healthy behaviour through collective decision making and action [244]. Using this model, people analyse problems and resources within the community to address problems. In the process of becoming organised for action, the community

undertake certain roles such as 1. Analysing the root causes of the problem, 2. Sharing decision making and actions, 3. Focussing efforts for specific problems, 4 Active participation of all stakeholders, 5. Capacity development for sustained change, and 6. Establishing a mechanism for continued feedback to the community [245].

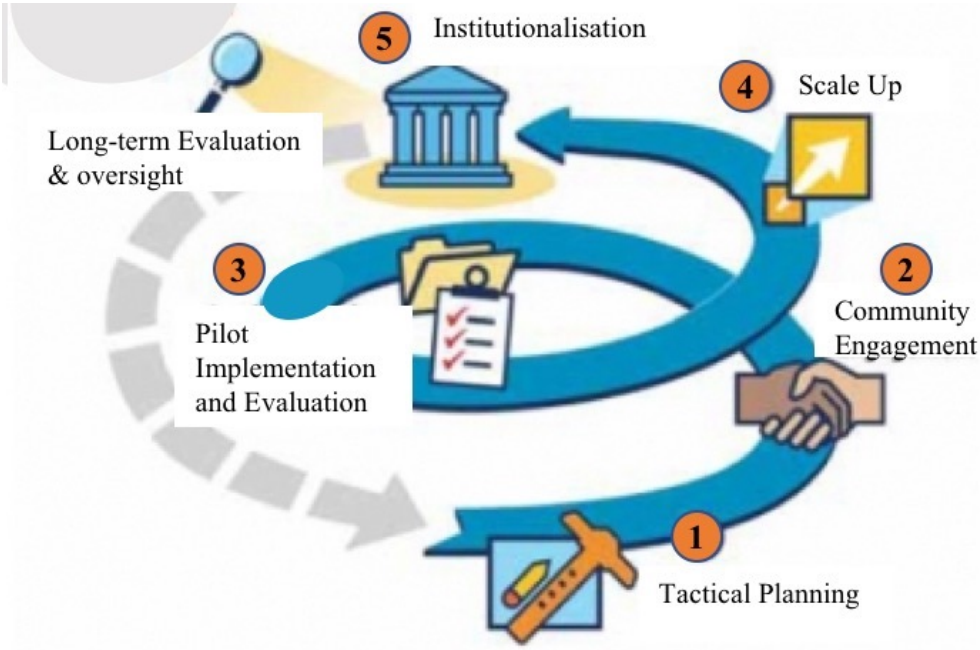



Figure 2.2 Diagram of Community Organization Model

#### 2.16.1.1 Relevance of the Model

Given the construct of the model, it is essential to comprehend the community context to have *tactical planning.* The stage of *community engagement* is equally important for any community-based intervention to be effective. Similarly, *pilot implementation and evaluation*, *scaling up* of the successful intervention and *institutionalisation* are the key stages for any intervention to become a complete project. It is therefore the concepts and stages of the model that were important to the intervention planned for the community education in Nepal.

### 2.16.2 Social Network Theory

A social network is a set of established relationships. Social network theory views social relationships in terms of nodes and ties (links and connections) (Figure 2.3) [246]. It provides a quantitative framework characterizing social structure both at the organizational and individual levels [247]. Nodes are the individual actors within the networks, and ties are the relationships between actors. Social structures are observed in the form of actual actions and contacts which are not random but patterned. The dynamism of individuals appears as moving dots (units) not randomly approaching one another. Some are usually together, some meet often and some never. Social networks influence ideas, relationships, emotions, health, behaviour, politics and all social contexts [248]. The ripple effect of relationships is enormous, as seen in the statement: "How your friends' friends' friends affect everything you feel, think and do" [248]. The behaviour of individuals in social contexts can significantly influence others, even if they are not directly connected.

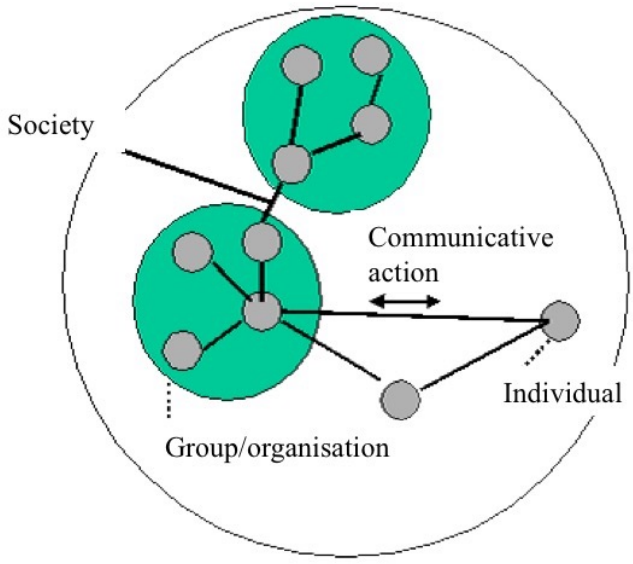


Figure 2.3 Conceptual Diagram of Social Network Theory

#### 2.16.2.1 Social networks and reciprocal support

A social network is a term used to describe community relationships that create a circle of people with a common interest. The establishment of social support is a key function of social relations [249]. Social networks intensify different community roles among people, for example, social control, social comparison, companionship, social influence, social undermining and social support. Social support is the functional content that is

categorised in four broad supportive acts: emotional support (empathy, love, trust, and caring), informational support (suggestions, information and advice to overcome problems), instrumental support (services and tangible aids) and support through feedback for self-evaluation. These four types of support, however, are difficult to study individually since one type of support often overlaps with another [250].

#### 2.16.2.2 Translating the concept of social networks to health promotion

People's health is interconnected to individual, group and community practices. Thus, health care providers and provisions need to be sensitive to these social phenomena such as social events, interactions and practices [251]. The main issues in improving health support within society are as follows: who should provide the support; to whom should support be provided; and when should support be provided.

In a social setting, reciprocal support among people is an everyday occurrence, both in formal and informal networks. For example, family, friends, co-workers and supervisors provide support in an informal setting, and public service workers and other professionals provide support in a formal setting. In such networks, people are likely to take part in a variety of supports [252]. The effectiveness of support provided depends on the source of support, meaning the "who" factor becomes important [253]. For example, the support provided by family members will be long-term in nature, whilst support from friends and neighbours is more likely to be short-term [252]. In a health care environment, clients usually require emotional care from family members, neighbours, friends and most importantly, information support from health care professionals [254]. The most effective support is likely to come from those who have experienced the same problems [255]. Similarly, the recipient's perceptions of the issues are more important than the content and objectives of the support [256]. Researchers have documented that community

networks and supportive interactions are effective in enhancing health and wellbeing [257]. This concept was suitable in organising the intervention research in Nepal. We invited each group found within the community to participate in the different stages of intervention and utilised their inter-group and intra-group social networks to improve knowledge of safer pregnancy and childbirth.

### 2.16.3 The Health Belief Model

Godfrey Hochbaum, a research psychologist at the University of North Carolina, developed the Health Belief Model (Figure 2.4) in 1952 [258]. The Model is a framework for understanding and modifying behaviour. It describes how a person perceives any situation or problem and describes a pathway to possible behaviour modification. This model is about motivating people to undertake healthy behaviour. Based on this concept, a person who feels that they may have a problem that can be avoided is given the options for behaviour modification. For example, in the case of antenatal examinations, a pregnant mother who is not having antenatal care may realise that if periodic prenatal examinations are made, the risks of complications and death may be avoided. After consideration of the perceived risks to her health and life, she may then change her behaviour and attend the recommended antenatal check-ups. The aim of the Health Belief Model is to avoid a negative health consequence. Health workers ought to be able to capitalise on a desire to avoid negative pregnancy outcomes and so promote the practice of healthy behaviour [259].

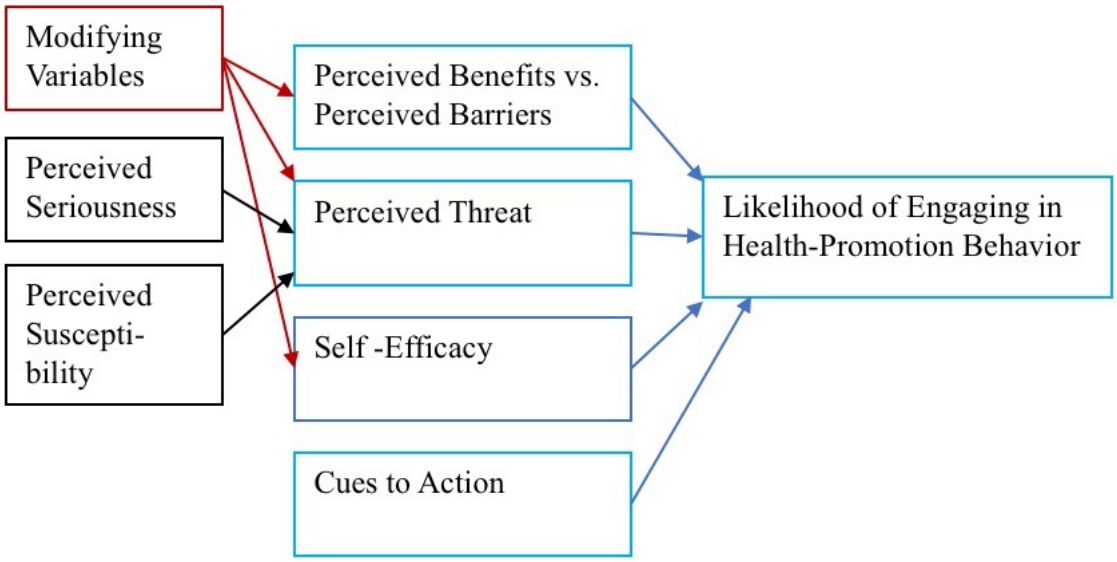



Figure 2.4 Structure of Health Belief Model

#### 2.16.3.1 Relevance of concepts of Health Belief Model

Pregnancy carries risks of complication and death. Based on the model, modifications in antenatal health seeking behaviour are likely to happen. For example, the concept of *perceived susceptibility*, (Figure 2.4) can be applied to pregnant women in Nepal; they believe they are at risk of complications and even death during pregnancy and childbirth. The concept of *perceived seriousness* of those negative outcomes drives women to attend antenatal examinations that help them to understand and detect the risks and complications on time. The *perceived benefit* of attending such examinations will assist in better health seeking actions. However, it must be recognised that women face external barriers in complying with care recommendations. As mentioned previously, economic, social or personal difficulties may prevent women from seeking antenatal care.

The concept of *perceived barriers* must be identified before ways to reduce or overcome them can be explored. Pregnant women may have access to information from local female community health volunteers and health workers. In the concept of *cues to action*, information could include messages alerting women to facts such as "For every 100,000

livebirths, 190 mothers will die from complications of childbirth- deaths that could have been avoided had antenatal examinations been taken. Early detection of risk is possible. Be safe, get examined before it is too late". *Self-efficacy* is realised as women gain knowledge of how to make both pregnancy and childbirth safer. An example would be not only the acceptance of antenatal care, but the ability to access it more easily. The consideration of these concepts for rural health promotion and planning is essential [260]. However, the Health Belief Model has been criticised as taking an individualistic approach. Interventions aimed at changing the behaviour of the community as a whole are likely to be more successful than an individualistic approach [259]. Thus, interventions designed to change behaviour need to be enacted at the community-level, and the intervention should consider the Community Organization Model and consider Social Network Theory.

### 2.16.4 Theoretical relevance with the intervention research organised

Table 2.1 Theoretical relevance

| Theory and model | Level | Summary | Key concepts | Criticism |
|---|---|---|---|---|
| Community Organization Model | Community | Health promotion workers help the community to identify problems, and to plan and implement strategies collectively to solve the problems. | a) Social planning<br>b) Social action | Change in behaviour can also occur at the individual level. It is not necessarily that it always should take place at the community level. |

| | | | | |
|---|---|---|---|---|
| Social Network Theory | Group and individual | Social networks influence ideas, relationships, emotions, health, and behaviour. Behaviour of individuals influence others. | Consulting, sharing of resources and promoting social networks | This theory is focused at the group level. The network could function in mass settings as well. |
| The Health Belief Model | Individual | For people to adopt new behaviour, the perceived threat of poor health and the benefits of healthy behaviour should outweigh the barriers to action. | Perceived susceptibility, severity, benefits and barriers to action, cues to action and self-efficacy | Focused on the behaviour of the individual. Nominal change in the behaviour of the community. |

The theories discussed (Community Organization Model, Social Network Theory and The Health Belief Model), have established theoretical knowledge on how new behaviours are generated and incorporated into a cultural environment. These models and theories, however, have been inadequate in offering frameworks for bringing about behavioural change. For example, in the context of nursing education, practice and research theory, it has been criticised as "*Too often these theories have done little to increase our knowledge of women and people of color. For the most part, they have contributed to the oppression of individuals and groups*" [261]. The issues of behaviour

change in relation to the application of theories have been criticised as they are limited to the socioeconomic, political and cultural contexts of society. The focused quantitative studies sometimes have distorted findings of the actual observed behaviours [224] in the societies.

With pregnancy, five people are particularly important: the mother, the father-in-law, mother-in-law, husband, and the female community health volunteer; a successful outcome requires all five to be involved in childbirth planning. Male engagement, in particular, is essential because of men's involvement in managing issues such as seeking skilled care, finance, and transportation [262].

Community engagement in health interventions is important in embedding knowledge into local cultures [263]. Previous work suggests that the more the interventions are designed and constructed with consideration given to local culture, the greater the likelihood of success in long-term behavioural change [264].

We could not find evidence that songs have previously been used to educate a whole community on safer pregnancy and childbirth outcomes. However, in Moyamba, Sierra Leone, the creation of songs by students, performed as drama, was found to be associated with a reduction in teenage pregnancy [265]. We could not find evidence that school students have previously been considered and mobilised for health promotion interventions.

In summary, the review of the literature was helpful to comprehend the issues related to the project. As the project was designed for the remote rural context, the literature relevant to the sociocultural, traditional, economic and health seeking practices were of particular

importance. In addition to the study of related literature, the systematic review of community participation interventions to improve maternal health outcomes in South Asia was an important learning experience to design, develop and engage communities to ensure their meaningful leadership in the project undertaking. Furthermore, the study of the theoretical bases (Community Organisation Model, Social Network Theory and Health Belief Model) related to the behaviour change intervention contributed considerably in identifying and practice of the appropriate methods and approaches of intervention. We hypothesised that the community's attitude to maternal care during pregnancy could be changed through the use of singing programs. The aim of the research was to investigate whether the involvement of people within a community in the process of creating awareness through singing and distribution of the Holy Duty wall chart could improve the level of maternal health care as well as awareness of the need for maternal health care among community members. The objective of the research was to establish the knowledge of men and women before and after an intervention about the role of family and community during pregnancy and childbirth.

# Chapter Three

# Systematic review of community participation interventions to improve maternal health outcomes in rural South Asia

(Verbatim)

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# Systematic review of community participation interventions to improve maternal health outcomes in rural South Asia

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**Abstract**

**Background:** This is a systematic review on the effectiveness of community interventions in improving maternal health care outcomes in South Asia.

**Methods:** We searched electronic databases to June 2017. Randomised or cluster randomised studies in communities within rural/remote areas of Nepal, Bangladesh, India and Pakistan were included. Data were analysed as risk ratios (RR) or odds ratios (OR), and effects were adjusted for clustering. Meta-analyses were performed using random-effects and evidence quality was assessed.

**Results:** Eleven randomised trials were included from 5440 citations. Meta-analysis of all community interventions combined compared with control showed a small improvement in the number of women attending at least one antenatal care visit (RR 1.19, 95% CI 1.06 to 1.33). Two community mobilisation sub groups: home care using both male and female mobilisers, and education by community mobilisers, improved the number of women attending at least one antenatal visit. There was no difference in the number of women attending at least one antenatal visit for any other subgroup. There was no difference in the number of women attending 3 or more antenatal visits for all community interventions combined, or any community subgroup. Likewise, there was no difference in attendance at birth between all community interventions combined and control. Health care facility births were modestly increased in women's education groups (adjusted RR (1.15, 95% CI 1.11 to 1.20; 2 studies)). Risk of maternal deaths after 2 years (RR 0.63, 95% CI 0.24 to 1.64; 5 studies), and 3 years (RR 1.11, 95% CI 0.52 to 2.36; 2 studies), were no different between women's education groups and control. Community level mobilisation rather than health care messages at district level improved the numbers of women giving birth at health care facilities (RR1.09 (95%CI 1.06 to 1.13; 1 study)). Maternal health care knowledge scores improved in two community-based interventions, one involving education of male community members.

**Conclusion:** Women's education interventions may improve the number of women seeking birth at a health care facility, but the evidence is of low quality. No impact on maternal mortality was observed Future research should explore the effectiveness of including male mobilisers.

**Trial registration:** This systematic review is registered with PROSPERO CRD42016033201.

**Keywords:** Community, Networks, Rural, Pregnancy, Antenatal care, Delivery, Pregnancy complications, Maternal death

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## Background

More than 800 women worldwide die each day from pregnancy and childbirth-related complications [1] with 99% of these occurring in low and lower middle-income countries [2–5]. South Asian and sub-Saharan African countries bear the highest burden of maternal death [6]. The widest level of disparity in maternal mortality is between low/lower middle, and high-income countries. The lifetime risk of maternal death in high income countries is one in 3700, compared with one in 160 live births in low income countries [7]. It has been estimated that 16% to 33% of all maternal mortality may be avoided by preventing complications through the provision of skilled personnel at birth [8].

Quality care throughout pregnancy and childbirth is associated with good maternal and infant outcomes [9]. Antenatal care uptake in rural settings is dependent on social and cultural factors [10]. Increased access to antenatal care, provision of skilled birth attendants and pregnancy care awareness programs at the local level contribute to safer pregnancies and childbirth [11]. In rural families, money, food and other logistics have all been seen to have an important influence on maternal health outcomes [12]. For instance, in Nepal, pregnancy and childbirth are considered to be the domain of women [13]. Although mothers-in-law commonly make decisions on pregnancy-related issues [14], permission must be sought from the male head of the household for any costs associated with seeking pregnancy care. As it is very uncommon for men to take an interest in pregnancy-related care issues, the resulting lack of communication limits women's access to pregnancy care [15]. Gender disparity and discrimination is common in South Asian countries like Nepal and is particularly prevalent in rural settings [16].

Health care interventions are often limited to a rigid and structured operational framework rather than being designed to meet the socio-cultural and economic realities of the communities they serve [17]. National programs and strategies often fail to consider the hardship imposed by distance and lack of infrastructure that is peculiar to people living within rural settings [18]. Poor social status among women in South Asian countries is a great contributor to lack of family planning and a rising population growth. This "feminisation of poverty" in the region is a fundamental anomaly that has impaired societal development [19]. Engaging local people to educate and mobilise the community has the capacity to provide multidimensional benefits [20] such as: helping to modify practices [21], encouraging a sense of community [22], and emboldening the identification of local methods to address problems [23].

Changing people's attitudes is required, but the best method for doing this is unclear. This systematic review aimed to compare the overall effect of different approaches to community participation in maternal health care education compared with health service or control/standard care interventions, on important maternal health outcomes. Furthermore, this systematic review aimed to examine which interventions promote husband, family and community awareness and involvement in maternal health care and result in better maternal health care-seeking and utilisation of maternal health services for improved maternal health outcomes in rural South Asian countries.

The overall objective of this systematic review was to compare the effectiveness of interventions to promote family and community participation in maternal health care against standard health care and health service led programs on the outcomes: indicators of maternal health care knowledge improvement, maternal health care utilisation (antenatal care, facility birth, skilled birth attendant use), and maternal mortality in rural-remote regions of the South Asian countries, Bangladesh, India, Nepal, and Pakistan.

## Methods

### Search strategy and selection criteria

Database searches were initially conducted in November 2015 and updated in June 2017. No restriction was placed on language or year of publication (refer Medline search strategy, Additional file 1). Hand searches were conducted on the reference lists of included studies.

This systematic review and meta-analysis were conducted according to a prospectively registered protocol (PROSPERO CRD42016033201) dated 14 January, 2016 and reported as per the Preferred Reporting in Systematic Reviews and Meta analyses (PRISMA) Guidelines [24].

We included cluster randomised trials or randomised trials evaluating different community health promotion interventions compared against each other, or against control or health service-based interventions, involving women, men, family and community members living within rural areas of Nepal, Bangladesh, India and Pakistan. We excluded studies of urban populations, and middle to high-income countries. Primary outcomes included: indicators of improved knowledge among women of childbearing age, their husbands/partners, family and community members, skilled provider attendance at birth (formal provider, traditional birth assistant), delivery at a health care facility and maternal mortality. The secondary outcome was male involvement in supporting access to maternal health care provision defined as; the supportive role played by men particularly husband, father-in-law and others with decision making capacity to access care during pregnancy, childbirth and postnatal period [25]. Traditional birth assistant (TBA) is defined as; *"a person normally a female, who assists*

*mothers during childbirth and who initially learns her skills delivering babies by herself or by working with another more experienced TBA"* [26].

Two authors (BBS, LJ) independently extracted data from the full-text articles using the Covidence program [27]. Any differences in opinion were resolved by consensus. Data were cross-checked for accuracy by both authors. Reviewers (BBS, LJ) independently assessed the risk of bias (low, high, or unclear) (refer Additional file 2) of all included trials using the Cochrane 'Risk of bias' tool and evidence quality was assessed using GRADE [28, 29]. Any disagreements were resolved by discussion until consensus was reached. Data were analysed using Review Manager Version 5.3. Meta-analyses were performed using fixed-effects modelling, random-effects modelling was substituted in situations where heterogeneity ($I^2$) was greater than 20%. Publication bias was assessed by visual inspection of funnel plots and incorporated in GRADE quality assessment [30]. Results for dichotomous data were presented as risk ratios (RR) with 95% confidence intervals (CI) [30. Continuous data were reported using mean difference (MD) or standardised mean difference (SMD) where appropriate [30]. All trials randomised the intervention at village or district level. To avoid unit of analysis error caused by clustering, the intra-cluster coefficient (ICC) was used to calculate the effective sample size of both intervention and control arms which was then used to adjust the standard error for all analyses [30]. Where not provided in the study, ICC estimates were imputed from other sources [31]. Data were entered into the analysis as inverse ratios (logOR or logRR) and adjusted standard errors. Sensitivity analyses were conducted including only trials of moderate quality or above [30].

In order to consider a study as overall having low risk of bias we defined that it had to have none of the domains considered as high risk of bias and at least four (not counting 'Other biases') considered as low risk of bias, and two of these must include 'random sequence generation' and 'incomplete outcome data' as the domains most likely to influence overall measurements of effect.

## Results

We identified 5440 citations in our search strategy, removed 525 duplicates and screened title and abstracts of 4915 (refer to Fig. 1 'Study selection'), resulting in 115 articles which we assessed in full text against the inclusion and exclusion criteria. Of the 45 articles remaining, we excluded nine studies that did not report any of the stated review outcomes, 15 contained insufficient information to make a judgement on whether they should be included or excluded, and six related to registered trial protocols awaiting publication of results. Of the 15 remaining publications there were only 11 independent studies as four studies had appeared in more than one publication.

Pregnant women and women of reproductive age (15 to 49 years or < 50 years) were most commonly targeted (9 studies), in addition to their in-laws (1 study), community members of any age (2 studies), and both women and men of reproductive age (1 study) (Tables 1 and 2). All studies were from rural and remote areas of low or lower middle income South Asian countries sharing a similar burden of maternal morbidity and mortality, including India (3 studies), Nepal (2 studies), Bangladesh (4 studies) and Pakistan (2 studies). Population sample sizes ranged from 1058 to 29,889 pregnant women, communities (health units, rural unions) or live births.

Eleven studies randomly allocated communities to community interventions; 10 studies compared a community intervention to a standard health care or control group (Table 1), and one (Acharya) compared different types of community intervention combinations at village or district level (Table 2). Two studies (Baqui, Midhet) assessed a community intervention against standard care or control group and provided data for comparisons between different community interventions. Four studies (Acharya, Baqui, Bhutta, Sharma) involved the use of community members to mobilise their community to take part in maternal health education and take practical steps to improve maternal health care within the community. Baqui compared the use of both male and female community mobilisers with the use of female mobilisers only. Darmstadt used community health workers to deliver a community education intervention. Six studies (list studies) involved the participation of community women in maternal health education groups. The intervention periods occurred over approximately 2 years.

In addition to examining the results for each outcome, all community interventions were compared against:

a) standard care or control (10 studies) (Table 1), and;
b) other community interventions (3 studies) (Table 2);

We identified the following post-hoc Community intervention subgroups:

1) Use of community mobilisers to deliver maternal health education;
   a. Home care by male and female mobilisers.
   b. Community care by female mobilisers.
2) Community education by health care workers.
3) Women's maternal health care education groups.
4) Women's and men's maternal health care education groups.

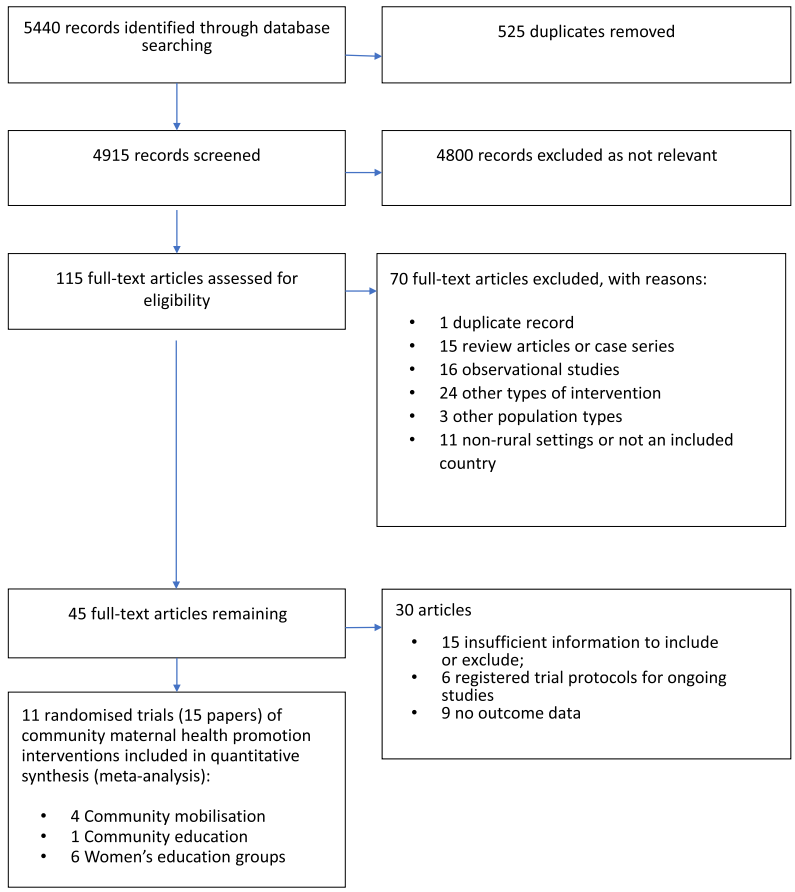


**Fig. 1** Study selection

As the design of cluster randomised studies is likely to have made it difficult to provide blinded participation and assessment, we rated all studies not blinded or not reporting blinding, as unclear risk performance and detection bias. The main domains of interest for these study designs were random sequence generation, allocation concealment, incomplete outcome data and subjective reporting.

Overall, six studies were assessed as low risk of bias, two (Tripathy 2010, 2016) as unclear risk, and three (Azad, Baqui, Midhet) as high risk. Azad, Baqui and Midhet reported > 10% losses of population outcome data to the final analysis over the study follow-up period. Although population outcome data losses at follow-up were < 10%, Tripathy 2010 excluded twice as many women and live births in the control group (169 women, 171 births from a total of 9260 births; 1.8% losses) compared with that of the intervention group (83 women, 84 births from a total of 9770 births; 0.9%) due to deaths, stillbirths and migration. Similarly, Tripathy 2016 excluded a greater percentage of population outcome data from the final analysis in the intervention group (6238 women from 82,702; 7.6%) compared with the control group (28 women from 73,817; 0.04%).

The individual results of all included studies are shown in Tables 1 and 2.

Two studies (Darmstadt, Sharma) reported improved mean knowledge scores among women of childbearing age, their partners, and family and community members. There was a small improvement in knowledge of maternal danger signs RR 1.40 (95% CI 1.12, 1.75) in receiving community education intervention by community health workers compared with a control group, whilst Sharma demonstrated improvement in maternal health care knowledge among community members receiving health care messages in a community singing intervention compared with control. Post-intervention, knowledge doubled in the intervention group from a mean of 11.60/36

**Table 1** Characteristics of studies. Community interventions versus health services, standard care or control

| Study/Year published Country Duration of intervention | Design | Population | n | Risk of Bias [a] | Intervention | Control | Outcome | OR | RR |
|---|---|---|---|---|---|---|---|---|---|
| Azad [42] Bangladesh 2005 to 2007 | Cluster RCT 18 clusters | Women aged 15 to 49 years having given birth during the study period | 29,889 | 1. Low 2. Unclear 3. Unclear 4. Low 5.High 6.Low 7.Low Overall: High | Women's education groups plus health system improvement | Control (health system improvement) | Antenatal care | | |
| | | | | | | | any | 0.78 [0.51, 1.19]* | 0.91 [0.76, 1.09]** |
| | | | | | | | ≥ 4 visits | 0.15 [0.06, 0.40]* | 0·79 [0.46, 1.37]*** |
| | | | | | | | Skilled birth attendant formal provider | 0.45 [0.19, 1.11]* | 0.90 [0.72, 1.14]** |
| | | | | | | | Delivery at a health care facility | 0.75 [0.62, 0.89]*** | 0.97 [0.77, 1.24]** |
| | | | | | | | Maternal deaths | | |
| | | | | | | | 2 years | – | 1.80 [1.2, 3.17]* |
| | | | | | | | 3 years (N = number of live births for all outcomes above) | – | 1.67 [1.00, 2.79]* |
| | | | | | | | MMR (over 3 years) (live births per 100,000) | 388.9 vs. 189.10 | 2.02 [1.11, 3.68]** |
| | | | | | | | | | 1.74 [0.97, 3.13]# |
| Baqui [49] Bangladesh 2003 to 2006 | Cluster RCT 24 clusters | All married women of reproductive age (15–49 years) | 5110 | 1.Low 2.Low 3.Unclear 4.Low 5.High 6.Low 7.Low Overall: High | Community mobilisation: home care by female mobilisers visiting every 8 months | control | Antenatal care Any (N = number of live births) | 1.70 [1.07, 2.68]* | 1.13 [0.93, 1.36]* |
| | | | | | Community mobilisation: Community care by male mobilisers visiting every 10 months and female mobilisers visiting every 4 months | control | Antenatal care | | |
| | | | | | | | Any (N = number of live births) | 2.67 [1.70, 4.21]* | 1.47 [1.21, 1.70]* |
| | | | | | Community mobilisation: Both community and home care | control | Antenatal care | | |
| | | | | | | | Any (N = number of live births) | 2.13 [1.33, 3.39]* | 1.37 [1.15, 1.63]* |
| Bhutta [50] Pakistan 2006 to 2008 | Cluster RCT 16 clusters | Pregnant women and women of reproductive age (15–49 years) | 4474 | 1.Low 2.Unclear 3.Unclear 4.Low 5.Low 6.Low 7.Low Overall: Low | Community mobilisation | Healthcare workers (standard healthcare) | Antenatal care | | |
| | | | | | | | Any | 1.64 [1.03, 2.62]* | 1.20 [1.01, 1.42]* |
| | | | | | | | ≥ 4 visits | 1.51 [0.79, 2.88]* | 1.44 [0.75, 2.77]* |
| | | | | | | | Delivery at a health care facility (any) (N = number of women for all outcomes) | 1.53 [1.36, 1.72]*** | 1.24 [1.17, 1.32]*** |

**Table 1** Characteristics of studies. Community interventions versus health services, standard care or control *(Continued)*

| Study/Year published Country Duration of intervention | Design | Population | n | Risk of Bias [a] | Intervention | Control | Outcome | OR | | RR | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Darmstadt [51] Bangladesh 2004 to 2006 | Cluster randomised trial 12 clusters | All married women of reproductive age (15–49 years) | 3491 | 1.Low 2.Unclear 3.Unclear 4.Low 5.Low 6.Low 7.Low Overall: Low | Community education by community health care workers | Control | Antenatal care | | | | |
| | | | | | | | Any | 2.29 [1.34, 3.91]* | | 1.40 [1.12, 1.75]* | |
| | | | | | | | Skilled birth attendant | Not reported | | Not reported | |
| | | | | | | | Delivery at health care facility (N = number of women for all outcomes) | 1.20 [0.62, 2.29]*** | | 1.19 [0.63, 2.27]*** | |
| | | | | | | | Maternal danger sign knowledge score: | Mean score Intervention | | Mean score Control | |
| | | | | | | | | Pre | Post | Pre | Post |
| | | | | | | | a. Antenatal [0–10] | 1.0 | 2.9 | 1.1 | 2.2 |
| | | | | | | | b. Labor/ delivery [0–11] | 1.1 | 2.4 | 1.2 | 1.9 |
| | | | | | | | c. Postpartum [0–9] | 1.0 | 2.5 | 1.0 | 2.5 |
| Fottrell [52] Bangladesh 2005 to 2007 | Cluster randomised trial 18 Clusters | Ever-married women of reproductive age (15–49 years) who were permanent residents including in-laws and ado-lescent girls | 17,940 | 1.Low 2.Unclear 3.Unclear 4.Low 5.Low 6.Low 7.Unclear Overall: Low | Women's education groups plus health system improvement | Control (health system improvement) | Antenatal care | | | | |
| | | | | | | | ≥ 4 visits | 1.37 [0.99–1.88]** | | 1.28 [0.13, 12.11]* | |
| | | | | | | | Skilled birth attendant | 0.54 [0.38, 0.78]** | | 0.92 [0.71, 1.20]* | |
| | | | | | | | Delivery at health care facility (any) (N = number of births for above outcomes) | 1.05 [0.88, 1.25]** | | 0.94 [0.55, 1.59]*** | |
| | | | | | | | Maternal deaths 2 years (N = number of live births) | – | | 0.59 [0.30, 1.18]* | |
| | | | | | | | MMR (over 2 years) (per 100,000 live births) | 153.4 vs. 276.10 | | 0.74 [0.34, 1.64]** | |
| Midhet** [53] Pakistan 1998–2002 | Cluster randomised trial 24 clusters | Women and men of reproductive age (all ever-married women under 50 years of age) | 2564 | 1.Low 2.Unclear 3.Unclear 4.Low 5.High 6.Unclear 7.Low Overall: High | Women's and men's education groups | Control | Antenatal care | | | | |
| | | | | | | | Any | 2.83 [1.60, 5.00]** | | 1.35 [0.81, 2.25]* | |
| | | | | | | | Delivery at health care facility (any) (N = number of pregnant women for all outcomes) | 1.3 [0.6, 2.7]** | | 1.28 [0.84, 1.96]*** | |
| | | | | | Women's education | Control | Antenatal care | | | | |

**Table 1** Characteristics of studies. Community interventions versus health services, standard care or control *(Continued)*

| Study/Year published Country Duration of intervention | Design | Population | n | Risk of Bias [a] | Intervention | Control | Outcome | OR | RR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | groups | | Any | 2.45 [1.40, 4.30]** | 1.32 [0.79, 2.20]* |
| | | | | | | | Delivery at a health care facility (N = number of pregnant women for all outcomes) | 1.3 [0.7, 2.5]** | 1.32 [0.86, 2.02]*** |
| | | | | | Both interventions combined (women's education groups and women's and men's education groups) | Control | Antenatal care | | |
| | | | | | | | Any | 1.38 [0.82, 1.34]* | 1.33 [0.84, 2.10]* |
| | | | | | | | Delivery at health care facility (any) (N = number of pregnant women for all outcomes) | 1.46 [0.99, 2.15]*** | 1.43 [0.99, 2.07]*** |
| Osrin [54] Nepal 1998–2000 | Randomised trial 24 Clusters | Women (aged 15–49 years) and key members of the community in improving perinatal health outcomes | 4241 | 1.Low 2.Unclear 3.Unclear 4.Low 5.Low 6.Low 7.Low Overall: Low | Women's education groups | Control | Antenatal care | | |
| | | | | | | | Any | 2.82 [1.41, 5.62]** | 1.32 [1.08, 1.60]* |
| | | | | | | | (N = number of pregnancies) Skilled birth attendant | | |
| | | | | | | | Any | 2.50 [1.51, 4.16]* | 2.26 [1.43, 3.57]* |
| | | | | | | | formal health provider (doctor or nurse) | 3.13 [1.62, 6.03]** | 2.96 [1.50, 5.84]* |
| | | | | | | | Traditional birth assistant (N = number of deliveries) | 1.70 [0.93, 3.11]** | 1.71 [0.89, 3.31]* |
| | | | | | | | Delivery at health care facility | 3.54 [1.56, 8.05]** | 3.38 [2.57, 4.45]*** |
| | | | | | | | Maternal deaths 2 years | | 0.18 [0.14, 0.24]* |
| | | | | | | | MMR (over 3 years) (per 100,000 live births) | 69 vs 341 | 0.22 [0.05, 0.90]** |
| Sharma 2018 [34] Nepal | Pre and post-test randomised | All community members (all ages eligible) | 1572 | 1.Low 2.Unclear 3.Unclear 4.Low 5.Low 6.Low 7.Unclear Overall: Low | Community mobilisation: Community singing to deliver healthcare messages | Control | 1. Mean change in knowledge scores (se): | | |
| | | | | | | | a. Importance of antenatal examination (out of 7) | 2·12 [0·06] vs 4.89 [0.06] | |
| | | | | | | | b. Importance | 3·71 [0·07] | 0.12 [−0.22, |

**Table 1** Characteristics of studies. Community interventions versus health services, standard care or control *(Continued)*

| Study/Year published Country Duration of intervention | Design | Population | n | Risk of Bias [a] | Intervention | Control | Outcome | OR | RR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | of supplementary diet and rest during pregnancy (out of 9) | vs 6·84 [0·06] | 0.46] |
| | | | | | | | c. Importance of delivery care (out of 12) | 2·95 [0·08] vs 5·09 [0·07] | |
| | | | | | | | d. Importance of childbirth planning (out of 8) | 2·81 [0·08] vs 5·50 [0·06] | −0.71[−1.3, −0.11] |
| | | | | | | | e. Overall knowledge (out of 36) | 11·60 [0·24] vs 22·33 [0·18] | −1.02 [−2, −0.03] |
| Tripathy 2010 [55] India 2005 to 2008 | Cluster RCT 18 clusters | Women of reproductive age (15–49 years) | 17,335 | 1.Low 2.Unclear 3.Unclear 4.Low 5.Unclear 6.Low 7.Unclear Overall: Unclear | Women's education groups plus health system improvement | Control (health system improvement) | Antenatal care | | |
| | | | | | | | Any | 0.97 [0.48, 1.97]** | 1.11 [0.99, 1.23]* |
| | | | | | | | | 1·60 (0·65–3·92)# | |
| | | | | | | | > 3 visits | 0.68 [0.37, 1.24]** | 0.70 [0.57, 0.87] * |
| | | | | | | | Skilled birth attendant | | |
| | | | | | | | Any | 0.52 [0.37, 0.74]** | 0.70 [0.57, 0.87]* |
| | | | | | | | Formal provider | 0.59 [0.37, 0.94]* | 0.67 [0.46, 1.00]* |
| | | | | | | | Traditional birth assistant | 0.82 [0.43, 1.56]* | 0.88 [0.68, 1.13]* |
| | | | | | | | Delivery at health care facility(any) (*N* = number of pregnant women for all outcomes) | 0.64 [0.39, 1.04]** | 0.71 [0.66, 0.75]*** |
| | | | | | | | Maternal deaths | | |
| | | | | | | | 2 years | | 0.82 [0.51, 1.33]* |
| | | | | | | | 3 years | | 0.77 [0.53, 1.13]* |
| | | | | | | | MMR (over 3 years) (per 100,000 live births) | 517.5 vs 680.3 | 0.70 [0.46, 1.07]** |
| Tripathy 2016 [56] India 2009 to 2012 | Randomised Controlled Trial 30 clusters | Women of reproductive age (15–49 years) | 7100 | 1.Low 2.Unclear 3.Unclear 4.Low 5.Unclear 6.Low 7.Low | Women's education groups plus health system improvement | Control (health system improvement) | Antenatal Care | | |
| | | | | | | | Any | 0.82 [0.35, 1.92]** | 0.90 [0.75, 1.07]* |
| | | | | | | | | 0·63 [0·35–1·16]# | 1.17 [0.78, 1.77]* |

**Table 1** Characteristics of studies. Community interventions versus health services, standard care or control *(Continued)*

| Study/Year published Country Duration of intervention | Design | Population | n | Risk of Bias [a] | Intervention | Control | Outcome | OR | RR |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Overall: Unclear | | | > = 3 visits (N = number of births) | 1.08 [0.58, 2.01]* | 1.16 [1.12, 1.20]** |
| | | | | | | | Delivery at health care facility | 1.23 [0.58, 2.60]** | 0.63 [0.25, 1.42]** |
| | | | | | | | Maternal deaths 2 years (N = number of live births for all of the above outcomes) | – | 0.63 [0.26, 1.55]* |
| | | | | | | | MMR (over 2 years) (per 100,000 live births) | 222 vs. 349 0.63 [0.25, 1.42]*** | |

[a]Risk of Bias tool (Cochrane)
*Adjusted estimate using outcome specific ICC
**Adjusted estimate reported by authors – adjusted for clustering and stratification
***Unadjusted estimate reported by authors
#Adjusted estimate reported by authors – adjusted for clustering, stratification and baseline covariates

to 22.33/36, an increase of 10.69 points [$P < 0.001$], with only a modest change in the control population [17.48/36 to 18.26/36].

For the meta-analyses, all community interventions combined increased attendance of at least one antenatal visit compared with control by an average of 19% (RR 1.19, 95% CI 1.06 to 1.33; participants = 75,737; studies = 8; $I^2$ = 58%) (Fig. 2). Intervention sub groups: use of community mobilisers, community care using female mobilisers, home care using both male and female mobilisers, and community education by health workers, had a similar effect (Fig. 2). However, there was no difference in effect in the number of women seeking at least one antenatal visit for community care using female mobilisers, women's education groups, and women's and men's education groups. There was no difference in the number of women attending three or more antenatal visits from any community interventions, or any intervention subgroups, compared with control (Fig. 3). Likewise, there was no difference in attendance by a person of any skill level, formal provider (doctor or nurse) or traditional birth attendant between community intervention and control groups (Fig. 4). Deliveries in health facilities were increased in women's education groups for meta-analyses of studies reporting adjusted RR 1.15 (95% CI 1.11 to 1.20; participants = 36,989; studies = 2; $I^2$ = 48%) but not in meta-analyses of studies reporting adjusted OR 1.19 (95% CI 0.71 to 1.99; participants = 49,590; studies = 4; $I^2$ = 76%) (Fig. 5). Estimates of RR and OR are more likely to be similar when the number of events is rare, which may explain the difference between OR and RR for antenatal care attendance as the number of events are comparatively much higher. For this reason, we have based our discussion and conclusions on RR in preference to OR. There was no difference in risk of maternal deaths at two (RR 0.63, 95% CI 0.24 to 1.64; participants = 61,487; studies = 5; 94%), and 3 years (RR 1.11, 95% CI 0.52 to 2.36; participants = 48,921; studies = 2; $I^2$ = 82%), between women's education groups and health service, standard care or control (Fig. 6).

No studies reported on the secondary outcome, indicators of male involvement (fathers-in-law and male partners) in maternal health care.

In addition to the varying results and evidence quality in the interventions and intervention subgroups described above, further investigation of potential contributors to heterogeneity by population (country), and outcome measurement (follow-up period 2 years vs. 3 years) subgroups showed no reduction in heterogeneity for any combination of community mobilisation interventions versus standard healthcare or control. There were insufficient data to explore the effect of these on the remaining comparisons.

## Discussion

Overall, meta-analysis of all community interventions combined showed modest benefits of in terms of improving attendance of at least one antenatal care visit

**Table 2** Community participation interventions versus combined health service and community interventions or other types of community-based interventions

| Study/Year published Country Duration of intervention | Design | Population | n | Risk of Bias [a] | Community and Health Service Intervention | Health Service Intervention | Outcome | OR | RR |
|---|---|---|---|---|---|---|---|---|---|
| Acharya 2015 [57] India 2005 to 2011 | RCT | Women becoming pregnant or giving birth during the study period (average age 27 years) and their families | | 1. Low 2. Unclear 3. Unclear 4. Low 5. Low 6. Low 7. Unclear Overall: Low | Community mobilisation at community level (L2) | Community mobilisation at community level combined with health care messages at district level (L1 and L2) | Antenatal care | | |
| | | | | | | | Any | 1.21 [0.86, 1.70]* | 1.04 [0.97, 1.10]* |
| | | | | | | | Skilled birth attendant | 0.90 [0.56, 1.43]* | 0.91 [0.61, 1.35]* |
| | | | | | | | Delivery at a health facility (*N* = number of women for all outcomes) | 1.10 [1.03, 1.17]** | 1.04 [1.02, 1.07]** |
| | | | | | Community mobilisation at community level (L2) | Healthcare messages at district level (L1) | Antenatal care: | | |
| | | | | | | | Any | | 1.07 [0.98, 1.17]* |
| | | | | | | | Skilled birth attendant | | 0.83 [0.64, 1.07]* |
| | | | | | | | Delivery at a health facility | | 1.09 [1.06, 1.13]** |
| | | | | | | | (*N* = number of women for all outcomes) | | |
| | | | | | Community mobilisation at community level (L2) involving 'Sure Start' community field workers working directly with ASHAs and strengthening village health and sanitation committees, and health care messages at district level (L1) | Healthcare messages at district level (L1) | Antenatal care: | | |
| | | | | | | | Any | | 0.76 [0.19, 3.08]* |
| | | | | | | | Skilled birth attendant | | 0.83 [0.64, 1.07]* |
| | | | | | | | Delivery at a health facility (any) | | 1.05 [1.02, 1.08]** |
| | | | | | | | (*N* = number of women for all outcomes) | | |
| Baqui [49] Bangladesh 2003 to | Cluster RCT 24 clusters | All married women of reproductive age | | 1.Low 2.Low 3.High | Community mobilisation: home care with female mobilisers visiting every | Community mobilisation: Community care | Antenatal care: | | |
| | | | | | | | Any | | 0.76 |

**Table 2** Community participation interventions versus combined health service and community interventions or other types of community-based interventions *(Continued)*

| Study/Year published Country Duration of intervention | Design | Population | n | Risk of Bias [a] | Community and Health Service Intervention | Health Service Intervention | Outcome | OR | RR |
|---|---|---|---|---|---|---|---|---|---|
| 2006 | | (15–49 years) | | 4.High 5.High 6.Low 7.Low Overall: High | 8 months | with Male mobilisers visiting every 10 months and Female mobilisers visiting every 4 months | | | [0.19, 3.08]* |
| | | | | | | | (N = number of live births, % = cluster averages) | | 0.94 [0.89, 1.00]** |
| Midhet** [53] Pakistan 1998–2002 | Cluster randomised trial 32 clusters | Women and men of reproductive age (all ever-married women under 50 years of age) | | 1.Low 2.Unclear 3.Unclear 4.Unclear 5.High 6.Unclear 7.Low Overall: High | Women's and men's education groups | Women's education groups | Antenatal care | | |
| | | | | | | | Any | 1.42 [0.99, 2.05]* | 1.05 [0.89, 1.24]* |
| | | | | | | | Delivery at a health facility (*N* = number of pregnant women for all outcomes) | 1.01 [0.65, 1.56]** | 1.01 [0.67, 1.53]** |

[a]Risk of Bias tool (Cochrane)
*Adjusted estimate using outcome specific ICC (Page 1)
**Adjusted estimate reported by authors – adjusted for clustering and stratification
***Unadjusted estimate reported by authors
#Adjusted estimate reported by authors – adjusted for clustering, stratification and baseline covariates

but not the recommended four antenatal visits recommended by the World Health Organisation. Meta-analysis showed no difference in assistance of birth attendants at birth between all community interventions combined, or any community intervention subgroup and control. Women's education group interventions rather than health service or control, and community level mobilisation rather than health care messages at a district level, increased the numbers of women delivering at a health care facility. There was no difference in maternal mortality for meta-analyses between community intervention groups, intervention subgroups and health service, standard care or control. A community-based health promotion intervention [32], including men, women and community members from rural Nepal, showed an improvement in overall knowledge scores for antenatal care and skilled birth attendance.

There were several limitations to the findings of this review. Evidence quality varied across the outcomes for the three main comparisons (refer Additional file 2 GRADE tables). There was moderate to considerable heterogeneity for all outcomes. As the majority of studies were primarily designed to evaluate neonatal rather than maternal outcomes, there were no outcome specific ICC available to calculate adjusted estimates of effect for some maternal outcomes, meaning that some study data for some outcomes, such as institutional delivery, could not be included in the analysis. Studies reported different maternal health knowledge outcome categories which could not be combined in a meta-analysis.

Our review demonstrated improved maternal health outcomes where male community mobilisers were involved in home-based community interventions. Previous evidence suggests that the need to prioritise male involvement in maternal health care education in addition to measures that aim to improve women's education and their status in the family [33]. Involvement of the male family members in maternal health care education is of particular importance in low socioeconomic and uneducated community environments [34]. Intervention strategies involving men and community leaders in maternal health care programs in Bolivia resulted in improved maternal health outcomes in a low resource environment [35]. A study carried out in Maharashtra, India concluded that the maternal mortality ratio was three times higher among women with uneducated husbands compared to

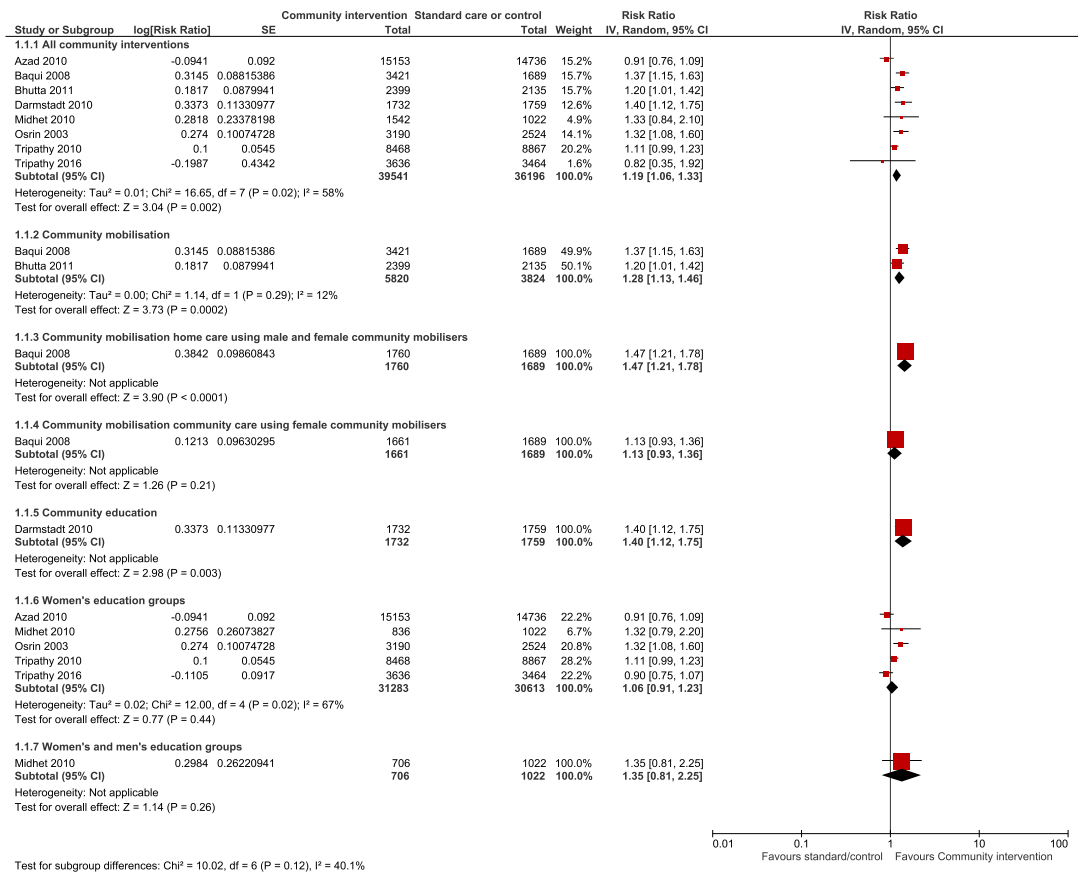


**Fig. 2** Forest plot of comparison: 4 Community interventions vs. standard health care, control or no intervention (all adjusted RR), outcome: Antenatal Care (any) adjusted RR

the group of women with college-educated husbands [36]. The involvement of husbands in the utilization of maternal care needs to be included as equally important as the improvement of women's education and their status in the family [33]. Although the involvement of male (fathers-in-law and husbands) members in maternal health care is critical, [37] only one study reported this outcome.

Previous research has concluded that women from deprived communities with poor access to health care and low levels of education have an increased risk of mortality [38]. All community interventions, and use of community mobilisers were more effective than health service, standard care or control, while women's education groups, female mobilisers, women's and men's (couples) education were not. The selection of suitable interventions is critical. This could be one of the reasons that, although worldwide maternal mortality seems to be decreasing, there has not been a similar change for women in rural/remote areas of lower and lower-middle income countries in South Asia [39]. A study carried out in Tamil Nadu, India showed improved maternal health care knowledge among both males and females following education via mobile phone text messaging. Ninety eight percent of participants surveyed responded that text messaging was an effective means of health education [40]. Although this study was carried out in a rural setting, the high level of literacy in Tamil Nadu may have influenced this result. This evidence may therefore not apply to all rural environments of South Asian countries, as use of mobile phone demands many prerequisites such as: ability to read and write, buying a mobile phone, and accessibility to mobile networks in remote locations.

Our meta-analysis found that there was no difference in the risk of maternal death in communities allocated to women's education groups compared to standard care or control. In a systematic review of women's participatory

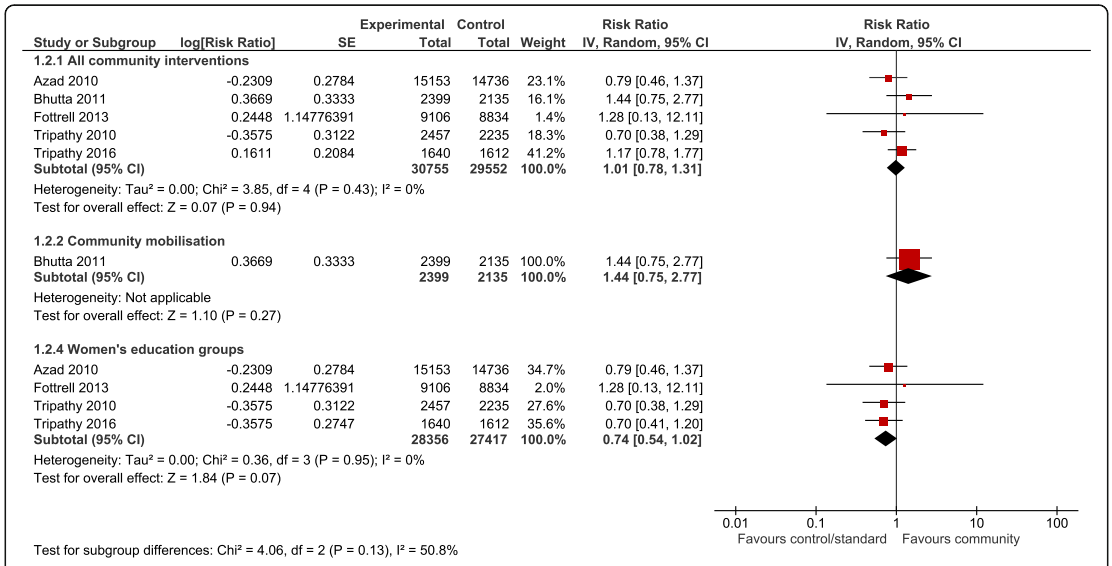


**Fig. 3** Forest plot of comparison: 1 Community interventions vs. standard health care, control or no intervention (all adjusted RR), outcome: Antenatal Care (≥ 3 visits)

groups in Nepal, Malawi, India and Bangladesh, also no difference in overall maternal mortality was found [41]. After having further divided the women's group according to the percentage of pregnant women attending, Prost [41] found that maternal mortality was halved only in those groups having > 30% pregnant women (OR 0.51, 95CI 0.29–0.89). Similarly, in our analysis, the only study showing increased risk of mortality, Azad [42], at 3 %, had the lowest proportion of pregnant women attending women's education groups out of all the studies in the meta-analysis. It is possible that women's education interventions may need to include a larger proportion of pregnant women in order to be more successful in reducing maternal mortality.

Another systematic review assessing the impact of community interventions on maternal health in resource poor economies, revealed that community-based programs integrated with multiple interventions greatly improved maternal health outcomes [43]. A review of randomised trials aiming to improve antenatal care practice

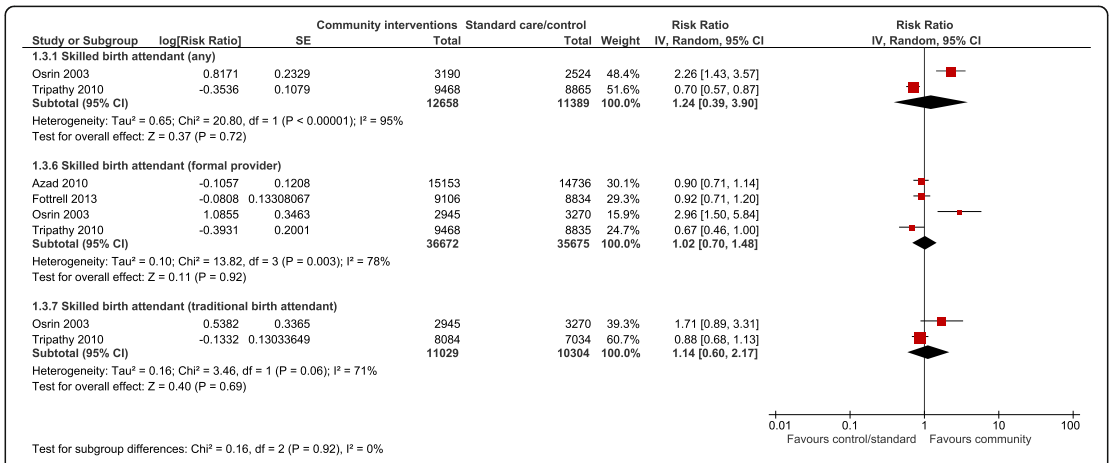


**Fig. 4** Forest plot of comparison: 1 Community interventions vs. standard health care, control or no intervention (all adjusted RR), outcome: Skilled birth attendant

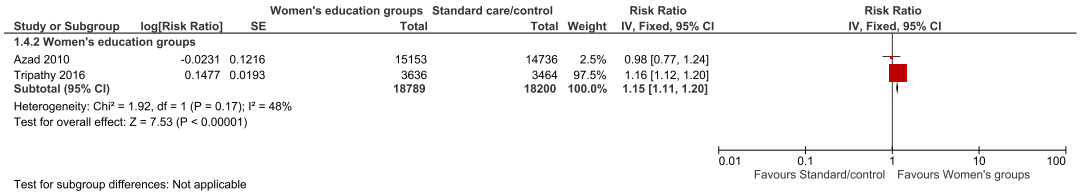


**Fig. 5** Forest plot of comparison: 1 Community interventions vs. standard health care, control or no intervention (all adjusted RR), outcome: Delivery at a health facility (all adjusted RR)

demonstrated a reduction in maternal mortality (OR 0.62, 95% CI 0.39–0.98) [44]. The effectiveness of these community level interventions on maternal outcomes challenges the viewpoint that these programs are not worth the cost.

Women's education group interventions did not improve the use of skilled care at birth. It is possible that the involvement of men who control finances and family decisions and improving infrastructure may have improved this outcome. For pregnant women to obtain necessary antenatal visits and skilled care during childbirth, it is necessary to discuss and plan pregnancy care with the men who are responsible for decision-making within the family [45]. Antenatal care is essential to help prevent pregnancy complications and minimize maternal mortality.

Our meta-analysis showed that the numbers of women attending at least one antenatal visit were greater among women receiving any type of community intervention and intervention sub groups. This finding is supported by a study conducted in Nepal that demonstrated improvement in maternal health care outcomes in rural communities using a female facilitator in organizing monthly meetings with women's groups [46].

Increased access to antenatal care, provision of skilled birth attendants and pregnancy care awareness programs at local level contributes to safer pregnancies and childbirth [11]. Previous studies have concluded that delivery in a health care facility offers much needed emotional support to pregnant women [47]. Presence of skilled professionals, lifesaving drugs and equipment help to reduce the risk of complications and death of mother and baby [48]. However, our meta-analysis demonstrated unexpected outcomes of community intervention. For example, none of the interventions were effective in increasing the number of women receiving any level of trained or skilled assistance at birth.

## Conclusion

A range of community interventions are likely to be successful in improving antenatal care attendance. Pregnant women receiving women's education group interventions were more likely to deliver at a health care facility. However, women's education groups were less likely to seek antenatal care or have a formal provider attend at birth. The contributing factors to this are unclear, but it has been previously suggested [41] that the varying

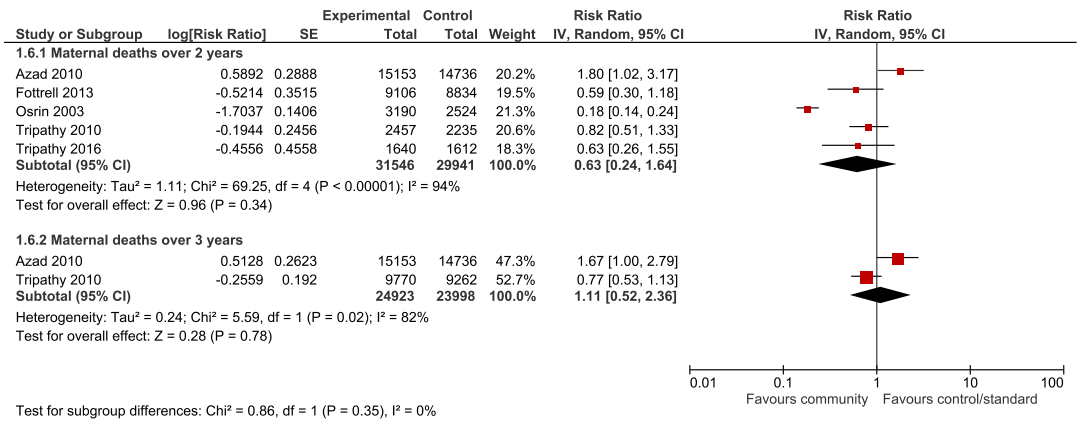


**Fig. 6** Forest plot of comparison: 1 Community interventions vs. standard health care, control or no intervention (all adjusted RR), outcome: Maternal deaths (N = number of live births) STATA one-way ICC

proportion of pregnant women attending women's education interventions among the included studies may have been an important factor. Moderate quality evidence from a single study suggests including male alongside female mobilisers in community mobilisation home care programs [34] may improve the success of women's groups on maternal health care outcomes. Further research is needed on the impact of male involvement in community interventions to supplement women's involvement in community mobilisation, which up until now has been the primary focus, and the impact of couple's education in preference to women only. National health guidelines should include evidence from current systematic reviews of randomised trials, when planning interventions to promote community education on maternal health care.

## Additional files

**Additional file 1:** The Medline search strategy. (DOCX 19 kb)

**Additional file 2:** Title of data: GRADE tables. List of outcomes, relative effects (95% CI), number of participants (studies) and certainty of the evidence (GRADE). (PDF 73 kb)

### Abbreviations
CI: Confidence interval; GRADE: Grading of Recommendations Assessment, Development and Evaluation.; ICC: Interclass correlation coefficient; MD: Mean difference; OR: Odds ratio; PRISMA: Preferred Reporting in Systematic Reviews and Meta analyses; RCT: Randomised controlled trial; RR: Risk ratio; SD: Standard deviation; SMD: Standardised mean difference; TBA: Traditional Birth Attendant

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### Availability of data and material
All data generated or analysed during this study are included in this published article [and its Supplementary Information files; search strategy and GRADE tables].

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### Authors' contributions
BBS and LJ wrote and registered the protocol. DL and RS commented on the protocol and provided guidance for the searches. BBS, LJ, and DB finalised the search strategies and DB conducted the database searches for related articles. BBS and LJ screened the search results, assessed the eligibility of all relevant studies for inclusion and extracted data BBS and LJ contacted the authors of respective studies for additional information, LJ conducted the quality assessment and analysed data, both were checked by DB. BBS, LJ, and DB contributed to the final manuscript. RS and DL edited and commented on the draft and provided overall supervision for the systematic review. All authors contributed intellectually to the work. All authors read and approved the final manuscript.

### Ethics approval and consent to participate
Not applicable

### Consent for publication
Not applicable

### Competing interests
The authors declare that they have no competing interests.

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# Chapter Four
# Methods

## 4.1 Introduction

The previous chapter presented a critical review of the existing literature on the issues of maternal health and the sociocultural and economic deprivation of women in resource-poor environments. The review also highlighted gender roles, the role and engagement of family and community during pregnancy and childbirth, and the theoretical basis of changes in health-seeking behaviour.

This chapter describes the research design, the selection of culturally suitable methods of intervention, the participants and the recruitment procedure, and the materials used. Information is also provided on the baseline survey, orientation, song competition and intervention. The chapter sets out the techniques employed during data collection, analysis of data, presentation of results and the development of the research documentary video and the associated storyboard. The reliability of the data, the limitations and ethical considerations of the research, and the role of the researcher in the research undertaking are also considered.

## 4.2 Research protocol development

At the beginning of the project, we discussed the research concept with the supervisors, Laureate Professor Roger Smith and Professor Deborah Loxton, with a focus on the socio-cultural, economic, geographic and health-seeking issues at the village level in rural Nepal. There were numerous regular and ad hoc meetings with supervisors to discuss the design, development and organisation of the intervention research plans. Based on these discussions, the research plan was formulated, and it was decided to use communication through singing as a method of health education.

The key health messages to be included in the songs (see 3.8 Below) were finalised with the assistance of Dr Henry Murray, a specialist in obstetrics at the John Hunter Hospital, who is familiar with maternal health issues in rural Nepal and has practiced in low-income settings.

To develop a robust research plan, we undertook an in-depth study of relevant literature and conducted a systematic literature review (Chapter 2) to understand the context and issues of maternal health in a resource-poor environment. We also used knowledge gained from more than twenty years' experience working for the Nepalese governmental health system while developing the research plans.

In the process of developing the research protocol and online survey design, we coordinated with Dr Ryan O'Neill, Ms Jenny Helman, Project Assistant and Mr. Ryan Tuckerman, Database developer, all of whom are part of the Priority Research Centre for Generational Health and Ageing, Faculty of Health and Medicine, Dr Carlos Riveros, Expert in bioinformatics and Dr Peter MacIsaac, Expert in Health Data statistics, at the Hunter Medical Research Institute (HMRI).

Upon developing the draft research protocol, we made presentations in different technical forums to seek feedback on the project. We introduced the research plan at the Lunchtime Seminar, School of Medicine and Public Health, University of Newcastle, Hunter Medical Research Institute (HMRI); the Department of Pediatrics, John Hunter Hospital; and the Mothers and Babies Research Centre (HMRI). The final confirmation document was submitted and presented to the Confirmation Committee of the University of Newcastle. The research proposal was officially accepted by the Committee on 10 December 2015. The main features of the approved protocol were as follows:

### 4.2.1 Research hypothesis

The research hypothesis is that the singing of songs containing health messages be used to increase community knowledge of optimal antenatal and birthing practices in the rural villages of the hill districts of Nepal.

### 4.2.2 Purpose

The purpose of this research is to investigate whether the involvement of people within a community in the process of creating awareness through singing can improve their knowledge of maternal health care.

### 4.2.3 Research objective

To establish the level of knowledge of men and women regarding optimal antenatal and childbirth care before and after an intervention.

## 4.3 Research design:

A randomized control trial (RCT) design was applied. Two groups of the population (subjects) were randomly assigned to one of two clusters (Figure 4.1). One (the intervention cluster) received the intervention, while the other (the control cluster) did not. The two clusters were then followed up to measure if there were any changes in outcomes before and after the intervention and so evaluate the effectiveness of the intervention. RCTs are the most rigorous way of determining whether the cause–effect relationship exists between the intervention and the result(s) [266].

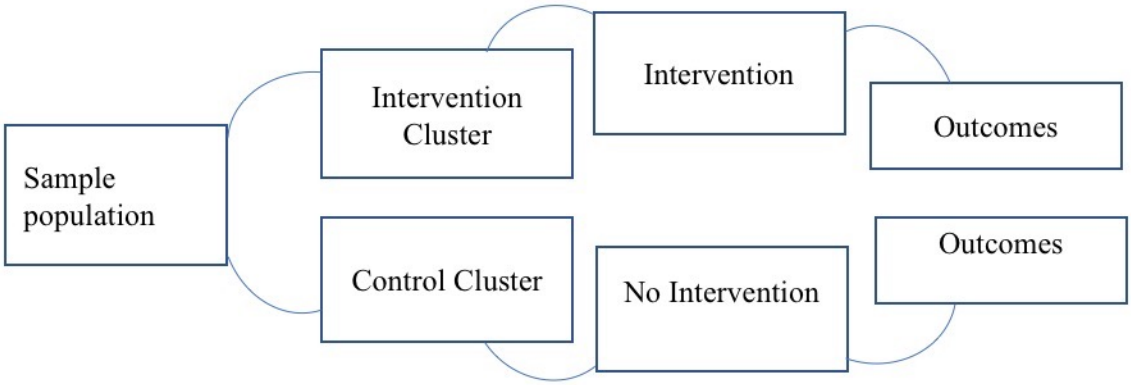


Figure 4.1 Diagram of randomized control trial

### 4.3.1 Trial Structure

The research plans were developed as per the established design of the RCT (Figure 4.1). The population to be studied was located in one of the remote hill districts (Parbat) in the western region of Nepal, where maternal mortality is high [267]. Four VDCs (Ramja Deurali, Chitre, Mudikuwa and Falebas Khanigaun) were selected for the research. These four VDCs were assigned to two clusters, the intervention and control. In one cluster, Ramja Deurali and Chitre were paired, and in the other, Mudikuwa and Falebas Khanigaun were paired (Figure 4.2). These village development committees were selected based on their rurality, matching the size of the population and number of households in the villages. These clusters are located at a considerable distance from one to another and separated by rivers and mountains. The structure of the trial is shown in Figure 4.2.

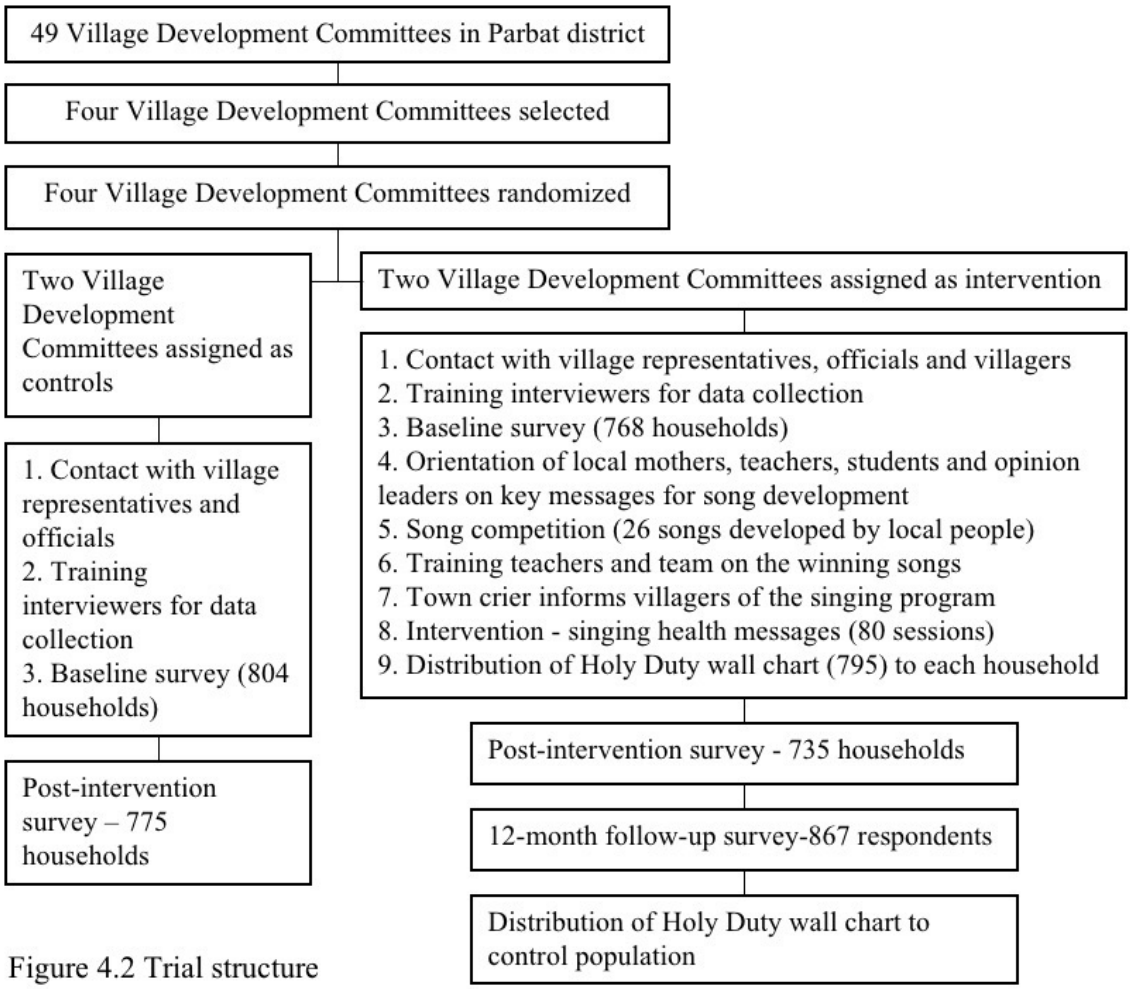


Figure 4.2 Trial structure

The remaining VDCs (45) were excluded from the study for not meeting inclusion criteria such as rurality, not matching population size with an adjoining VDC, the provision of health services and distance from district headquarters.

## 4.4 Sampling:

A non-probability sampling technique was applied. Quota sampling, purposive sampling, convenience sampling, snowball sampling and self-selection sampling were used. The advantages of non-probability sampling are cost, and time effectiveness as compared to probability sampling.

### 4.4.1 Sample size

A total population sample was considered for the research. Total population sampling is: *"a type of purposive sampling technique where one chooses to examine the entire population that have a particular set of characteristics. In sampling, units are the things that make up the population."* Each household as a unit of research was undertaken for study in both baseline and post-intervention surveys in the intervention and control clusters. However, at the 12-month follow-up survey, only the households of the intervention cluster were invited to take part for logistical reasons.

## 4.5 Randomisation and masking

All four Village Development Committees were asked if they were prepared to be randomised for an intervention. No participant in either cluster was informed of the design of the research; however, the village officials were informed, and consent was sought from them regarding the planned research activities. Randomisation of the two regions to either control or intervention was by coin toss. Chitre and Ramja Deurali VDCs were assigned as the intervention cluster with Mudikuwa and Falebas Khanigaun as the control (Figure 4.3). Details of the Village Development Committees selected are below (Table 4.1).

Table 4.1 Randomised Village Development Committees with number of households and population

| Research cluster | Village Development Committee | No of households | Population | | |
|---|---|---|---|---|---|
| | | | Total | Male | Female |
| Intervention | Ramja Deurali | 486 | 1779 | 783 | 996 |
| | Chitre | 435 | 1740 | 767 | 973 |
| Control | Falebas Khanigaun | 473 | 1925 | 840 | 1085 |

| | | | | | |
|---|---|---|---|---|---|
| | Mudikuwa | 467 | 1869 | 761 | 1108 |

Source: National Population and Housing Census 2011

## 4.6 Study area

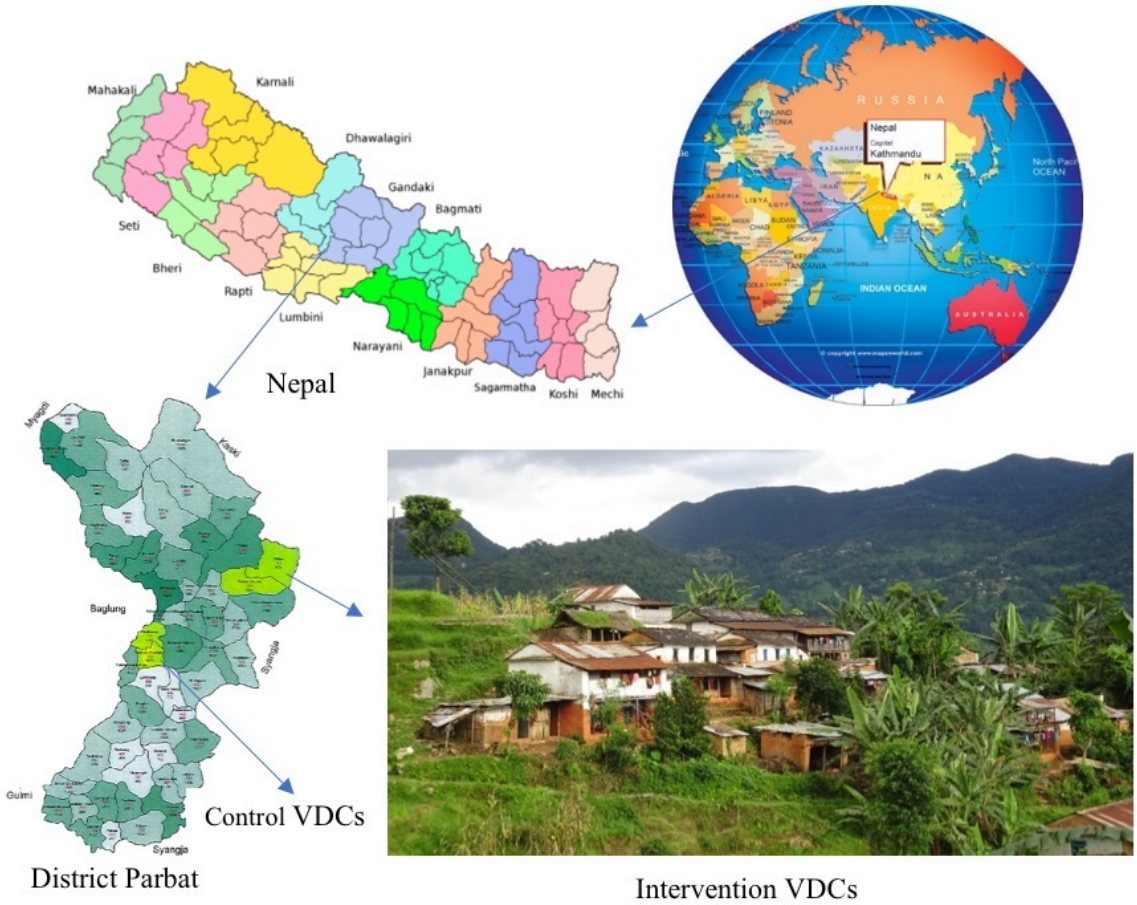


Figure 4.3, Nepal and Parbat district showing the intervention and control areas. The photograph is of one of the villages within the intervention area

## 4.7 Recruitment

### 4.7.1 Recruitment of research units

All the households in the research area were recruited as research units. Kitchen use was the defining characteristics of a household. Family members who shared the same kitchen on a daily basis were considered a household, irrespective of other locations where they might sleep or undertake other daily tasks. Similarly, if there was a family living under one roof, but family members used separate kitchens, they were regarded as separate

households, with those members using the same kitchen considered to be a household. Based on this operational definition of the household, we developed the strategy to identify the respondents.

### 4.7.2 Recruitment of respondents

We planned to have equal numbers of male and female respondents from the total number of households interviewed. We therefore recruited male and female heads of the household. All the respondents were adults who were head of the household in terms of managing resources and playing the key role in making family decisions. The most senior member of the family was invited to complete the survey. In rural Nepal, it is usually the man who manages the family resources and plays the key role in family decisions and finances and is considered the head of the household. However, for the purposes of this study, in alternate households, we considered the most responsible female member of the family as head of the household, whether a male was present or not, using the same criteria as for men. This was to ensure equal participation by sex as much as possible in the study. (Furthermore, in some cases women (e.g. widows) were actually head of their own household.)

## 4.8 Finalisation of key messages to be incorporated in the songs

As discussed with Dr Henry Murray, the key messages to be incorporated in the songs were the importance of antenatal visits, supplementary diet, rest during pregnancy, planning for childbirth, and the use of skilled birth attendants. Based on these concepts, the survey questionnaire, information statements about the research, orientation programs before the intervention and the structured song competition (each group will present a song in the community festival which will be judged by the local teachers and health workers) and community education were developed.

## 4.9 Development of online survey questionnaire

The structured survey questionnaire was used in baseline, post-intervention and follow-up surveys. The questions were registered and arranged in an online survey schedule at www.surveygizmo.com. With the help of simulated test interviews, the online survey schedule was developed and the finalisation of the questionnaire was completed (Appendix 1). The questionnaire was translated into the Nepali language to benefit both the interviewer and respondent (Appendix 2).

### 4.9.1 Organisation of the questionnaire

The questionnaire included items that asked about personal information followed by the information related to the research questions. While developing the questions, logics were applied where necessary. Using logic helped to skip unnecessary questions during the interview. The title of the questionnaire was "*Safer Pregnancy and Childbirth: Knowledge, Attitude and Behaviour Survey*".

The questionnaire was arranged as follows:

1. Personal information
2. Economic situation related information
3. Antenatal care related information
4. Delivery related information
5. Pregnancy history related information
6. Practice during pregnancy and childbirth related information
7. Pregnancy and childbirth management related information
8. Support during pregnancy and complications related information
9. Supplementary diet and rest during pregnancy related information
10. Childbirth planning related information

There were also some sections of the questionnaire for interviewers to complete before obtaining consent for the survey and others with instructions for the interviewers at each stage of the interview.

### 4.9.2 Survey

The questionnaire was designed so that the respondents would feel it was easy to answer. There were some questions intended to put the respondents at ease before they answered the key questions. Most of the questions were designed to seek an open-ended answer. This was designed to reveal the context of their responses rather than a simple "Yes" or "No". To make sure the answers were recorded accurately, interviewers were given ample time to understand the questions and their relevance. Considering the personal nature of some questions, it was essential to hold the interviews in a confidential environment. Interviews were designed to ensure privacy and offer the respondent an environment where they could respond freely to the questions. Interviews were therefore organised in a one-to-one environment.

## 4.10 Grant application

Upon obtaining approval from the Human Research Ethics Committee, we reviewed safety conditions of the research area and underwent the process of vaccinations and health check-ups and sought approval for Health and Safety from the University of Newcastle on 8 March 2016. With the final approvals, we developed grant applications for the project and travel costs. We were granted funding by the Jennie Thomas Project and Travel Grant. The total grant amount was AUD 31,000 (Travel Grant AUD 10,000, Project Grant AUD 20,000 and additional support for local equipment AUD 1,000). Having been granted the funds required, we applied for travel approval, which was approved by the University.

### 4.11 Preparations for intervention

Before travelling to Nepal, we ensured that the funds and the research equipment were available in the field. The researcher flew from Sydney to Kathmandu, Nepal on 5 April 2016 to carry out the intervention and returned to Newcastle on 1 September 2016. In Nepal, with the help of a professional language expert we translated the research questionnaires (Appendix 2) and information statements developed for the respondent (English: Appendix 3, Nepalese: Appendix 4), Schools (English: Appendix 5, Nepalese: Appendix 6) and Village Development Committees (English: Appendix 7, Nepalese: Appendix 8).

### 4.12 Rapport building at the national level

In addition to the application, we discussed the project with the Director, Dr Khem Karki and other officials at The Nepal Health Research Council, Nepal. It was decided that the Nepal Health Research Council would serve as a contact point in case of any complaints being raised during the project. It was also decided that the respective Village Development Committee Secretary would report to the Council following any complaints raised in their respective villages. The Council would then contact the University of Newcastle for further action if required.

We also met with the Health Secretary Dr Senendra Upreti and with departmental and divisional directors to inform them of the project and to obtain their support. As well as this, we met the Minister Hon. Nar Devi Pun, in Kathmandu who represented the research area. She was pleased to discuss the project's significance and future implications.

### 4.13 Rapport building at the local level and other preparations

After meeting with key officials and recruitment of a project assistant, the researcher flew to Pokhara on 8 April 2016 to continue building rapport with local people and officials and to procure logistics for intervention research. In Pokhara, there were a series of meetings to share the project with regional level officials and politicians. As mentioned, the research clusters were in hard-to-reach areas. Therefore, we bought an off-road motorbike to enhance our mobility within the clusters.

It proved challenging to organise an online survey in a remote rural village setting where the power supply was not dependable, and a telephone connection was not available. An internet connection was not available in Pokhara, so Nepal Telecom was requested to arrange an internet device (Wi max) to be installed in the village. As we had to upload the data from two different clusters, and the device had limited range, we had to move it frequently from one cluster to another. Advice was sought from local people as to where to stay in the village and with their help an office was set up on the top of the hill to access the internet connection. The researcher updated his supervisors and donor of the progress achieved and challenges faced in the village environment.

Figure 4.4 Reaching the research village and setting up an office there

Communicating with the village secretaries, local leaders and people was a routine activity. The local leaders were informed of the design of the project and the role the interviewers would play during the survey. They understood the types of questions asked and the level of skills required to carry out the surveys. They were requested to select interviewers locally even before reaching the village for the survey. We also communicated with the district Health, Education, Local and Women's Development Offices to inform them of the project and seek their support. After printing a large number of information sheets to be provided to the respondents, iPads and tablets were configured with the online questionnaire.

There was a long list of tasks to be managed and procured before departing to the village. With the help of government officials, members of the community, supervisors and the financial management of Joanne Davis (Administrative and Account officer at Mothers and Babies Research Centre, HMRI) preparations were completed well on time. We

arranged an off-road vehicle to move and transport all the logistics to Ramja on 21 April 2016. On the way to Ramja, the intervention village, the vehicle broke down. It was an interesting experience to face such an adverse situation in the rural environment. Another truck had to be arranged to bring the supplies to the village. The spontaneous support and empathy of the villagers to find the second vehicle and transfer the goods from one vehicle to another was priceless. The beauty and challenges of being in the remote village were both experienced.

As discussed with the local people, we had a house to reside in located in the village. Although the house was in the middle of the village, there was no running water or functional toilet. It was a typical experience of being in the remote village. After a few days, everyday activities took on the same rhythm as it did for the villagers. On the first day in the village the connecting gas pipe to the stove did not work properly and we had to spent time arranging for firewood to cook the first meal. After these initial arrangements, we set the office up in the house (Figure 4.4). The people in the village were very welcoming. The meetings with local people and groups went very smoothly on the basis of the prior discussions (Figure 4.5). Follow-up calls were made to key persons, particularly those who we could not meet in person.

In addition to meeting people in the intervention cluster, we made initial visits to the control cluster to inform and seek consent from the respective Village Development Committees and to discuss the training plan with the interviewers selected by the local communities. We met and discussed the baseline survey with different groups of people in both Ramja Deurali and Chitre Villages. Given the cultivation season, most of the people were in the fields. Therefore, meeting people while at work in the fields was the appropriate option for us to make contact with people in the villages.

Figure 4.5 Meeting with community leaders and officials

Meetings with traditional healers about education through singing health messages was an interesting part of trip. They shared the experience of their attempts to heal pregnancy, childbirth and after-childbirth complications. One of the traditional healers invited us to record the healing process. We then arranged a video recording of the process. In this case, a young lady aged 20 had a miscarriage in her first pregnancy when she was 16 weeks pregnant. This time, she was 14 weeks along and experiencing discomfort. Her mother-in-law informed the traditional healer to arrange a healing session. Usually such processes are performed at night. The pregnant lady was brought to the traditional healer's house. They brought a few hundred grams of rice, some money and a pair of pigeons to offer to the traditional healer. This visit to the traditional healing session, organised by the mother-in-law following pregnancy complications was recorded during our research within the intervention area. Link: https://www.youtube.com/watch?time_continue=11&v=InnHX-Dj2Hw.

As part of rapport building, we participated in village life. Information was transmitted to the villagers while being involved in their daily activities. We worked in the paddy field to prepare for planting (Figure 4.6), worked alongside men and women cultivating finger millet, worked with the village ladies making flour using a hand mill and ground rice using a local wooden rice mill.

Figure 4.6 Researcher enhancing informal communication on the project, working together with locals while preparing the paddy field for plantation

Detailed procedures of community contact, rapport building, community orientation, the song competition and intervention, including the surveys carried out, have been illustrated with the help of a photo eBook. Please visit the link to view the eBook: https://www.dropbox.com/s/eztixdbhum5m521/Link%20PDF%20PathwaystoImprovingMaternalMortalityinRemoteRuralNepal.pdf?dl=0

### 4.13.1 Recruitment of project assistant

We recruited Mr. Nava Raj Paudel, as a project assistant qualified in computing and information technology. He trained the interviewers on the technical issues of the online

survey schedule and resolved the issues raised during data collection and uploading the responses. Mr. Nava Raj also maintained financial records.

### 4.13.2 Recruitment of interviewers

Meetings with village secretaries, village leaders, school teachers and opinion leaders decided the selection criteria for interviewers and their training before the baseline survey. There were eight interviewers (two interviewers from each VDC) recruited for the baseline survey. All the interviewers selected were female. Given the contents of the survey, villagers suggested the use of female interviewers. The interviewers were invited to carry out the post-intervention survey as well. The date and venue for training the interviewers was decided by the community and provided free of cost. The role of the community in selecting the interviewers not only worked well but also achieved community ownership of the process. The criteria for the selection of the interviewers were as follows.

1. The interviewer should be educated to a minimum of grade twelve
2. The interviewers should be female
3. She should have the interest and time to work in the village
4. The interviewer should be able to collect data using iPad/tablet
5. She should be from the local area
6. The interviewer should have basic the English language ability to use the device and understand the questions appearing in the device

## 4.14 Training interviewers

Two days of training were organised (Figure 4.7) for the interviewers at baseline, post-intervention and follow-up surveys so that they understood the objectives of the surveys.

The training ensured the interviewers were familiar with the questions and their recording system in an online environment. A detailed training program was developed to ensure the logical organisation of the training sessions (Appendix 11). The training contents included a) Introduction to survey, b) Information about the questions involved (English: Appendix 16, Nepalese: Appendix 17), c) Questioning techniques, d) Introduction to the method of online/offline data collection, e) Instructions on how to upload the data recorded, f) Orientation on the ethical issues, G) Importance of informed consent, H) Consent forms, and I) Information statement to the participants. During the training, interviewers practiced data collection skills through role play sessions. The practice sessions were provided until all interviewers were confident enough to collect data independently.

Figure 4.7 Training local interviewers

### 4.15 Baseline surveys

A baseline survey was organised simultaneously in both clusters (Intervention and Control) before the intervention (Figure 4.8). There were eight interviewers (four in each cluster) mobilised for the interviews. A structured survey questionnaire was developed in Nepalese (Prashnawali) for the baseline, post-intervention and follow-up surveys. Respondents who consented to take part in the surveys (baseline, post-intervention and

follow-up) gave written consent with either a signature or fingerprint. They were free to decline or terminate the interview at any time. The baseline surveys were then completed (control n=804 and intervention n=768). The male or female heads of all households in the research area were interviewed. Through this process an adult member of the family responsible for household decision making and finances was approached from each household.

Figure 4.8 Baseline Survey

### 4.16 Community orientation

After baseline data collection, workshops were set up in the intervention cluster with village officials, teachers, students, mothers' group members, adolescents, female community health volunteers, opinion leaders, and local politicians (Figure 4.9). The participants discussed the concept of the project. These workshops were useful to orient the community on the design of the song competition and its relevance to the intervention to be organised throughout the community.

Figure 4.9 Orientation sessions about the key message areas and the song competition to be organised within the community

Then with the help of the local mothers, community health volunteers, leaders, and teachers, twenty-three orientation sessions were organised as follows: teachers (5), students (6), mother's group members (3), volunteers (2), adolescents (5), village officials (2). These sessions clarified the key message areas of safer pregnancy and childbirth as well as introducing the concept of a community song competition program to transmit the knowledge. Following the agreement of all these community members, participatory research plans were developed.

### 4.17 The song competition

A song competition program was organised in the intervention cluster by the different groups of people developing health songs on safer pregnancy and childbirth. The theme of the songs and the design of the program was discussed with teachers, students, mothers, youths and female community health volunteers.

After consultation with the community, including district level authorities, the groups were provided with the concept sheet of key messages developed in the local language (Appendix 12). A total of 24 days (17 May to 9 June 2016) were provided for the groups to write, rehearse and organise internal competitions. The local leaders decided the date, venue, and the judges for the competition. The criteria for the groups to present the songs were also discussed and finalised as follows: 1. There should be a minimum of five to a maximum of seven people in a group, 2. The songs should be developed using locally popular melodies, 3. A song should have a minimum of ten specific song lines from the key concept area given and 4. A song should not take longer than ten minutes to sing.

Information regarding the concept areas for song writing was provided through group orientations, in schools, and also by health workers, volunteers, and the town crier (employed to reach people in isolated areas). In schools, internal song competitions were organised to nominate the best songs for the actual competition to be held in the community. The songs were judged by the local teachers and health workers, both male and female, using criteria decided by the community leaders and local teachers. The marking criteria, out of 100, were set as follows: 1) For giving complete messages- 35; 2) Use of appropriate words- 20; 3) Clarity and order in the message- 20; 4) Use of a locally popular melody- 20; and 5) Punctuality and presentation- 5.


Figure 4.10 Song competition among the mothers' group members, Community Health Volunteers, youth club members, students and teachers

All the groups performed their songs at a festival organised in a community hall of Chitre village on 10 June 2016 (Figure 4.10). The song competition was expected to lead to perhaps three to four teams of singers and dancers, but in fact twenty–six groups of local people in the intervention cluster participated in the development of health songs. Each group prepared a dance to perform during the song. Even the total of twenty-six groups underplays the effect within the community, since within each school there had already been a competition to decide which songs would be presented at the competition. The six best songs were selected for the next stage of the intervention and were taught to teachers, students, and traditional singers for the intervention in the villages.

### 4.18 Modification of the program following community recommendations

It was initially planned to use two travelling minstrels called Gandharba to perform the winning songs in the villages. However, when the school teachers, who were judging the

competition, heard the songs and realised how important they were, they said they should undertake this job themselves and take the health messages to the villages. The community leaders and school management committees welcomed the proposal of the local teachers, arranged the time for the teachers to organise the intervention and selected the members of the team to be involved. It was decided that there would be two teams performing the songs in the villages of Ramja Deurali and Chitre. The Chitre VDC decided to mobilise six teachers for the intervention team and in Ramja Deurali the intervention team included a traditional singer, students, a community leader and local youths, all led by a teacher. These community recommendations were approved by project supervisors in Australia.

### 4.19 Training intervention teams

A two-day training program was developed (Appendix 13) to provide training to the intervention teams from Ramja Deurali and Chitre VDCs. Six winning songs were selected to take to the community for education. The songs were uploaded to a computer and distributed to each member of the intervention team (Appendix 14) in Nepalese, Roman script and English. The songs were collected in hand-written form on the day of the competition. The training sessions were designed to practice and rehearse the songs (Figure 4.11) and discuss the role of the members; for example, the question of who would introduce the program, manage the use of the town crier for prior information, carry and distribute the Holy Duty wall chart and the use of musical instruments and the Public Address (PA) system. At the end of the training, the team members discussed and developed the route plans for the intervention sessions separately for the two different Village Development Committees.

Figure 4.11 Training intervention team before the intervention

### 4.20 Use of local musical instruments

As recommended by the local people and the team members selected for intervention, local musical instruments called Damphu, Madal, Khaindi and Mujura, were procured from the local market as well as the Public-Address (PA) system to be used during the singing intervention and to play the health songs during processions through the villages. Figure 4.12 shows the local instruments used during the intervention.

Figure 4.12 Local musical instruments (Damphu, Madal, Khaijadi and Mujura) used in the intervention

### 4.21 Intervention through community involvement

The intervention in Chitre was organised from 14 to 23 July 2016 and in Ramja Deurali from 5 to 12 August 2016. There was community house-to-house singing and singing and dancing sessions were held in the schools, tea shops, on the roads and even in the fields if people were working there. In both villages, a total of 80 sessions were organised reaching all the households and an estimated 2,400 local people heard the messages

provided through the songs. The overwhelming community participation in the intervention and singing sessions was recorded every day (Appendix 15, list of YouTube videos of the research events and community participation). The local people were very happy (Figure 4.13) not only with the information provided but also with the engagement of every section of the community in the programs.


Figure 4.13 Community participation in the education sessions organised in the villages and fields where people were to be found

### 4.22 The Program Banner

A program banner was used to reinforce the key health messages in each intervention session (Figure 4.14). A translation of the messages on the banner is shown below.


Figure 4.14 Banner used in each intervention session

a) Ensure four antenatal check-ups b) Make sure that you eat varieties of food (rice, green leafy vegetables, meat, maize and milk) every four hours. c) Have eight hours of rest / uninterrupted sleep every day. Minimise hard/heavy and long hours of work. d) Ensure you have rested every four hours to take the weight off your feet. e) After three months of pregnancy, start taking iron tablets regularly until 45 days after delivery. f) Discuss and finalise your delivery plan together with your father-in-law, mother-in-law, husband and community health volunteer and

g) Ensure institutional / skilled delivery.

## 4.23 Distribution of the Holy Duty wall chart

To complement the messages provided through the singing, a pictorial wall chart was developed to distribute to each household of the intervention cluster (Figure 4.15). The wall chart incorporated pictures of local gods to encourage villagers to value the health messages and preserve the wall chart as a Holy Duty.

With the help of this Holy Duty wall chart, we aimed to educate family members with limited literacy, especially mothers-in-law. The chart illustrated the times and frequencies for the antenatal check-up, the importance of supplementary diet and rest (a minimum of eight hours of rest in 24 hours) during pregnancy. Other messages concerned the need for childbirth planning and use of skilled birth attendants. All the messages presented were developed in accordance with the Nepalese Government's health education and communication protocol and were finalised in consultation with the Nepalese Government. During the intervention, we provided a wall chart to each household in the intervention cluster.

Figure 4.15 Holy Duty wall chart

Table 4.2 Translation of Holy Duty wall chart

| Holy Duties for Safer Pregnancy and Childbirth | | |
|---|---|---|
| Month(s) of pregnancy | Holy duties for safer motherhood | (Photo of mother-in-law and daughter-in-law) We will do... (Photo of Goddesses) |
| Finger showing first month | Photo of Female Community Health Volunteer | Once the pregnancy is known, inform family members and the Female Community Health Volunteer. |
| Fingers showing second month | Photo of balanced diet | Start eating a variety of food (rice, vegetables, meat, maize and milk) every four hours. |
| Fingers showing third month | Photo showing - "No smoking" and "No alcohol" | After three months of pregnancy, start taking iron tablets regularly until 45 days after delivery. Smoking and drinking during pregnancy are dangerous. |
| Fingers showing fourth month | Photo of a doctor and a balanced diet | Visit a health facility for the first antenatal examination. If you experience any health problems during pregnancy, you should visit the health post immediately. It is essential to take additional food during pregnancy. |
| Fingers showing fifth month | Photo of the pregnant women taking rest during pregnancy | Ensure eight hours of rest / uninterrupted sleep every day. Minimise hard/heavy and long hours of work. Make sure you have rested every four hours with the weight off your feet. |

| | | |
|---|---|---|
| Fingers showing sixth month | Photo of a doctor and interaction with Female Community Health Volunteer | Discuss and finalise the plan for the birth together with your father-in-law, mother-in-law, husband and Female Community Health Volunteer and make the second antenatal visit. |
| Fingers showing seventh month | Photos – pregnant women being carried out on the back to take to the health post | The following plans are very important for safer childbirth: 1. Save or arrange money for childbirth 2. Plan for transportation to the health facility 3. Confirm with the health institution for skilled care at delivery |
| Fingers showing eighth month | Photos of a doctor and mobile phone | Visit the health institution for the third antenatal check-up and finalise transportation and the plan for the childbirth. Inform the health facility in advance. |
| Photo of grandmother and a new born baby | Photos of health post and a doctor | Time for the fourth antenatal visit. Make sure that you have money, people to carry the pregnant woman or other transportation means. Ensure skilled delivery. |

### 4.24 Coordination and communication

Progress on the project was reported regularly to the supervisors and donor in Australia to seek regular guidance. Progress was also reported to the local, district, and national authorities in Nepal. There was close liaison with district health, education and women's development offices to ensure their support. At the local level, there was contact with local people and officials on a daily basis. Given the strong social network of the female community health volunteers, their engagement in each stage of the project was assured.

## 4.25 Post-intervention survey

After the intervention, and as discussed with the community leaders, the interviewers trained for the baseline survey were contacted for the post-intervention survey. Five out of eight interviewers who were involved in the baseline survey took part in the post-intervention survey. Training for the three new interviewers was organised with the help of the experienced interviewers. The survey was organised from 25 July 2016 to 19 August 2016 in each household in both the intervention and control clusters. During the post-intervention survey (Figure 4.16) a total of 1,510 responses (intervention-775, control-735) were collected.

Figure 4.16 Post-intervention survey

## 4.26 Debriefing

After all activities were completed, a meeting with school management committees, teachers, students, village secretaries and youths (part of the intervention team) was organised to inform them of the project outcomes and to thank them for their excellent engagement and leadership in the project. Similar debriefing meetings were held at the national level to advise health executives.

### 4.27 Follow-up survey

A follow-up survey was carried out to measure the retention of relevant knowledge 12 months after the intervention. A follow-up survey questionnaire was developed for the intervention cluster (Appendices 16- English, 17- Nepali). Due to logistical reasons, we could not conduct the follow-up survey in the control cluster. We recorded the responses of heads of household, in the same way as for the baseline and post-intervention surveys. In addition to the responses of the heads of household, young respondents (18-30 years) were also interviewed to identify any differences in knowledge retention between the heads of the household and younger respondents. A total population sampling considering each household as a sample unit, was conducted in all the surveys. At baseline and post-intervention surveys, the specific questions related to each subdomain a) antenatal care (Q22, Q23, Q24), b) delivery care (Q25, Q26, Q27, Q28), c) supplement diet and rest (Q47, Q48, Q49, Q51, Q52, Q53), and d) childbirth planning, (Q55, Q56, Q57, Q58) and a total score was created for comparison. Total scores were recorded using a questionnaire developed for the study (Appendix 1). Scores were the summation of correct responses for the relevant question. Similarly, in the 12-month follow-up survey, questions related to supplementary diet and rest during pregnancy and planning for childbirth were measured. (The follow-up survey however, was conducted only in the intervention cluster).

### 4.28 Distribution of Holy Duty wall chart to the control population

As it had proved effective in the intervention, the Holy Duty wall chart was also distributed amongst the control population after the follow up survey. Before reprinting the wall chart, local people, including teachers and village officials, were contacted to see

if they wanted to modify the chart. Based on the suggestions received, a few modifications were made (Figure 4.17).


Figure 4.17 Modified version of the Holy Duty wall chart distributed to the control population

The modified wall chart was distributed to individual households, local shops, schools and government offices such as health facilities, post offices and offices of the Village Development Committee (Figure 4.18). The locals who were engaged in the baseline and post-intervention surveys as interviewers distributed the wall chart in the control area.


Figure 4.18 Distribution of Holy Duty wall chart in the control area

### 4.29 Cultural sensitivity

Understanding local culture and developing research methods to match local practices was a high priority for this project. The selection of singing health messages as the intervention method was itself done to respect local cultural practices. This method was accepted by the local people, especially women, and all age groups enjoyed the songs and health messages. We depended on the local people for advice and took local decisions into consideration at each stage of the intervention. The community engagement and

ownership in the programs ensured that all the activities were congruent with the local cultural practices, traditional norms and expectations. For example, we employed only female interviewers on the recommendation of the community leaders who considered the nature of the questions used in the surveys. The inclusion of the local deities in the Holy Duty wall chart was also one of many approaches respecting the local culture. The surveys and intervention were sensitive to when people were available. In many cases the interviews and singing sessions were organised in a field, on the road side and at common gathering places wherever people were found. In order for the program to run smoothly, a series of activities was carried out as follows (Table 4.3).

Table 4.3 Intervention and study description by research cluster

| Intervention / activities | Control cluster | Intervention cluster |
|---|---|---|
| Rapport building | | |
| Contact with people and village officials | Yes | Yes |
| Baseline survey | | |
| Selection of local interviewers | Yes | Yes |
| Training interviewers for data collection | Yes | Yes |
| Baseline data collection | Yes | Yes |
| Intervention preparation | | |
| Orientation on the theme- orientation for teachers, students, mothers group members, youths and female community health volunteers. | No | Yes |
| Orientation of students | No | Yes |
| Orientation of mothers group members | No | Yes |

| | | |
|---|---|---|
| Orientation of adolescents | No | Yes |
| Orientation of female community health volunteers | No | Yes |
| Orientation of village officials | No | Yes |
| Song competition | No | Yes |
| Intervention | | |
| Training teachers and teams on the selected songs for intervention | No | Yes |
| Mobilisation of the town crier to inform villagers of the intervention program | No | Yes |
| Distribution of Holy Duty wall chart | No | Yes |
| Intervention - awareness through singing health messages | No | Yes |
| Use of banner with key messages in each intervention session | No | Yes |
| Post-intervention survey | | |
| Post-intervention data collection | Yes | Yes |
| Follow-up survey | No | Yes |
| Distribution of Holy Duty wall chart to the control population after the evidence of effectiveness of intervention established | Yes | |

### 4.30 Handover of the equipment to the local schools

After the intervention and post-intervention survey, the equipment used during the intervention research and that could be used by local schools, for example, musical instruments, printer, the internet device and sound system, were handed over to three different schools in the intervention area.

### 4.31 Baseline and post-intervention survey data analysis

Statistical analyses were conducted using IBM SPSS version 24. Four subdomains of the knowledge survey (antenatal care, supplementary diet, rest during pregnancy, and planning for childbirth) were used to create a total score. In the absence of robust identification of the individual subjects in the two surveys, the analysis was conducted as a repeated cross-sectional study.

Differences in the change from baseline in knowledge score between the intervention and control clusters were assessed using linear regression models. *(Linear regression is a statistical method that allows us to summarize and study relationships between two continuous variables by fitting a linear equation to observed data)* [268]]. The independent variables in the model included period (pre-vs post), group (intervention vs control), and the interaction between group and time. The model also included the following potential confounding variables: age, sex, education, household employment, and marital status. The variance of the comparison groups was not considered equal and robust, therefore Huber-White Sandwich based estimators *("Huber Sandwich Estimator" can be used to estimate the variance of the maximum likelihood estimator (MLE) when the underlying model is incorrect)* [269] were used. Bonferroni corrections *(The Bonferroni correction aim to adjusts probability 'p' values. It is useful when a number of dependent and or independent statistical tests are carried out concurrently on a single data set)*[270] were used to adjust for multiple comparisons. Means and percentage change are presented for intervention and control regions at baseline and post-intervention with corresponding standard deviation, 'p'-values and 95% confidence intervals.

### 4.32 Follow-up survey data analysis

The follow-up data was appended with data collected during the main trial; it was assessed that there were no variables available to link previous survey responses, and as a result, the analysis was conducted as a cross sectional analysis. The follow-up survey collection procedure was altered so that a head of household and young respondent were surveyed. To compare the results with previously collected data, all of the sub-groups comparisons were calculated using responses of the head of households.

Linear regression with robust variance estimators was used to measure the changes between each time point within the study data. The assumption of equal variance was not met; as a result, Huber-White standard errors were used to protect against type I errors *(type 1 error: an incorrect rejection of a true null hypothesis also known as a "false positive" finding)*. Post-hoc comparisons *(Post hoc reasoning is an error where we assume that since one effect follows another, the first outcome may have been a trigger to the second. In some instances, this may be true, but other factors may also be responsible)* were used to best display the adjusted means with each of the comparison groups of interest. No adjustments have been made to the p-values; to protect against type one errors a p-value threshold of 0.001 should be taken, correcting for multiple testing. Age, education, employment status, marital status, age at first child, income and how the household manages on the available income were considered confounders for the linear models. Categorical demographics were tested using Chi-Squared test and continuous variables have been compared using ANOVA *(ANOVA: an analysis of variance, a statistical method in which the variation in a set of observations is divided into distinct components)* with adjusted standard errors *(standard error: a measure of the statistical correctness of an estimation, equal to the standard deviation of the theoretical distribution of a large population of such estimations)* for comparing means and Mann-

Whitney U test to compare medians *(The Mann-Whitney U test, which is also known as the Wilcoxon rank sum test, tests for differences between two groups on a single, ordinal variable with no specific distribution)* [271]. All statistical analyses were programmed using STATA version 12.

### 4.33 Development of an intervention research video documentary

A storyboard to develop a video documentary about the research undertaken in the context of Nepal titled "Pathways to Improving Maternal Mortality in Rural Nepal" was developed and implemented (Appendix 24) The sub-title of the video was "Instruments of Change". Based on the storyboard, a video documentary of the intervention research was developed. Please see video https://youtu.be/g8z0Vujkrh4. The documentary includes different aspects of the research project as follows.

1. Background information about the need for the research in the context of rural Nepal.
2. Research protocol development and selection of methods of community education.
3. Preparations for the intervention research
    a. Rapport building
    b. Logistics arrangements and setting up of the research arrangements in the village.
4. Processes followed to ensure community engagement and ownership in the project
5. Baseline survey
6. Community orientation for the song competition
7. Intervention
    a. Education through singing health messages in house to house environment

b. Distribution of the Holy Duty wall chart

8. Community participation and leadership in the projects
9. Post-intervention survey
10. 12-month follow-up survey and
11. The results of the intervention research

### 4.34 Ethical considerations

The ethical issues of the research were considered a priority. The research protocol was carefully designed and developed. With the incorporation of the feedback received from all the presentations, the research plan was submitted to a peer review sub-committee and granted approval on 30 November 2015. The research protocol was submitted to the Human Research Ethics Committee (HREC) at the University of Newcastle, Australia for ethics approval. The researcher, along with his supervisor Laureate Professor Roger Smith, presented the research plans and activities in person at the meeting of Human Research Ethics Committee. The Human Research Ethics Committee approved the research protocol, reference No: H-2015-0451 (Appendix 19). The ethics application submitted at the Nepal Health Research Council was approved, dated 27 April 2016, registration No:92/2016 (Appendix 20). Ethics approval to record the video and still photographs during the intervention (Appendix 21) was obtained. The consent forms for both interviews and video / still photograph recording was developed (Appendix 10). The University of Newcastle, Australia also granted approval to carry out the follow-up survey (Appendix 18). The researcher underwent safety risk assessment processes and obtained approval to visit Nepal to organise the intervention research.

The information statement for respondents (Appendices 3- English, 4- Nepali), schools (Appendices 5- English, 6- Nepali), and for the Village Development Committees

(Appendices 7- English, 8- Nepali) were also developed. Written consent was sought from the local schools (Appendix 9). The responses were collected after receiving informed consent from the participants. Similarly, an information statement was also prepared and used for video and still photograph recording (Appendix 22) and for the follow-up survey (Appendix 23). In the information statement, information on the care, confidentiality, rights, safety and expectation of respondents were mentioned as ethical standpoints. There was a provision established to enhance communication with regard to complaints about the processes and interventions at the local level through to the University. The VDC secretaries were notified as a focal person to manage complaints at the village level. If there were any complaints, the village secretaries could inform the National Health Research Council of Nepal and finally, if required, the National Health Research Council could communicate with the University of Newcastle, Australia. The responses were uploaded in an established survey system. The data accessed for analysis were kept safely and have been used for research purposes only.

### 4.35 Role of the researcher

Based on the initial concept research synopsis developed, a series of discussions with Laureate Professor Roger Smith and Professor Deborah Loxton were undertaken to finalise the research concept. With the immediate support and guidance of supervisors the researcher:

1. Designed, developed and finalised the research protocol.
2. Carried out a systematic literature review.
3. Applied for ethics approval at the University of Newcastle, Australia and at Nepal Health Research Council, Nepal.
4. Applied for a grant.
5. Applied for health, safety approval and travel to Nepal.

6. Undertook preparations for an intervention research to be carried out in rural villages in Nepal.
7. Established rapport at the national and local level before the intervention.
8. Facilitated community action to select and train interviewers.
9. Organised a baseline survey.
10. Organised community orientation about the key message areas before the song writing competition.
11. Coordinated with the Nepalese government to finalise messages to be imparted through the Holy Duty wall chart.
12. Coordinated with different groups of people to prepare for the song competition.
13. Facilitated communities to organise the song competition.
14. Organised training of intervention teams.
15. Facilitated the community to organise education sessions through singing health messages by the locals.
16. Carried out the post-intervention survey
17. Organised debriefing meetings within the community and at the Ministry.
18. Carried out a 12-month follow-up survey after the intervention.
19. Distributed a Holy Duty wall chart to the control population
20. Conducted statistical analysis of the data collected
21. Submitted results for publication.
22. Abstract submitted for publication (Published at the 65th Annual Meeting of the Society for Reproductive Investigation, 6-10 March, San Diego, CA). Title: Use of Songs Leads to Long-term Improvement in Knowledge of Antenatal Care in a Predominantly Illiterate Community. Reproductive Sciences, 2018;25;214A. Link: http://journals.sagepub.com/doi/pdf/10.1177/1933719118759999.

23. Poster presentation delivered at the 65th Annual Meeting of the Society for Reproductive Investigation, 6-10 March, San Diego, CA (Appendix 25), certificate of attendance (Appendix 26).
24. Developed a video documentary of the research project published.
25. Documented data for intervention research eBook published.

# Chapter Five A
# Intervention Research Video Documentary

Published along with the article titled "A first step to improving maternal mortality in a low literacy setting: the successful use of singing to improve knowledge regarding antenatal care"

(Verbatim)

The American Journal of Obstetrics and Gynecology, 2018.

https://doi.org/10.1016/j.ajog.2018.09.038)


Figure 5.1 Cover photo, Intervention research video documentary

Link: https://youtu.be/g8z0Vujkrh4

# Chapter Five B

# Intervention Research eBook

## "Pathways to Improving Maternal Mortality in Remote Rural Nepal

## PhD Project of Binod Bindu Sharma"

(Published document)


Figure 5.2 Cover page, Intervention research eBook

Role of researcher in development of eBook: Sought ethics approval to collect photographs and all relevant information necessary to develop and finalise the research eBook to the publication. Collected still pictures of the intervention research. Provided contextual and other relevant information related to the pictures presented.

Link: http://au.blurb.com/ebooks/654417-pathways-to-improving-maternal-mortality-in-remote-rural-nepal

# Chapter Six A Results

(Verbatim)

Original Research ajog.org

OBSTETRICS

## A first step to improving maternal mortality in a low-literacy setting; the successful use of singing to improve knowledge regarding antenatal care

Binod Bindu Sharma, MPH; Deborah Joanne Loxton, PhD; Henry Murray, DM; Giavanna Louise Angeli, PhD; Christopher Oldmeadow, PhD; Simon Chiu, DAppStat; Roger Smith, MB, BS, Hons, PhD

**BACKGROUND:** Preventable maternal mortality is related to delays in recognizing the problem, transport to a facility, and receiving appropriate care on arrival. Reducing maternal mortality in low-literacy settings is particularly challenging. In the rural villages of Nepal, the maternal mortality rate is among the highest in the world; the reasons include illiteracy and lack of knowledge of the needs of pregnant women. Culturally, singing and dancing are part of Nepalese daily life and present an opportunity to transmit knowledge of antenatal care and care at birth with a view to reducing the first 2 delays.

**OBJECTIVE:** We hypothesized that health messages regarding the importance of antenatal care and skilled birth assistance would be effectively transmitted by songs in the limited literacy environment of rural Nepal.

**STUDY DESIGN:** We randomly grouped 4 rural village development committees comprising 36 villages into 2 (intervention and control) clusters. In the intervention group, local groups were invited to write song lyrics incorporating key health messages regarding antenatal care to accompany popular melodies. The groups presented their songs and dances in a festival organized and judged by the community. The winning songs were performed by the local people in a song and dance progression through the villages, houses, and fields. A wall chart with the key health messages was also provided to each household. Knowledge of household decision makers (senior men and women) was assessed before and after the intervention and at 12 months using a structured questionnaire in all households that also assessed behavior change.

**RESULTS:** Structured interviews were conducted at baseline, immediately postintervention in the control and intervention areas (intervention n = 735 interviews, control n = 775), and at 12 months in the intervention area only (n = 867). Knowledge scores were recorded as the number of correct items out of 36 questions at baseline and postintervention, and of 21 questions at follow-up. Postintervention, test score doubled in the intervention group from a mean of 11.60/36—22.33/36 ($P < .001$), with no practically significant change in the control population (17.48/36—18.26/36). Improvement was greatest among the most illiterate members of the community (6.8/36—19.8/36, $P < .001$). At 12 months follow-up, a majority of the participants (63.9%) indicated that they provided information learned from the songs to their neighbors and friends, and 41.3% reported still singing the songs from the intervention.

**CONCLUSION:** The use of songs bypassed the limitations of literacy in communicating health messages that are key to improving maternal care in this low-literacy rural setting within a developing country. The improvements were maintained without further intervention for 12 months. With appropriate sociocultural adaptation to local contexts, this low-cost method of community education may be applicable to improving maternal health knowledge and behavior change in other low-resource and limited literacy settings that may lead to reductions in maternal mortality.

**Key words:** antenatal care, maternal mortality, pregnancy, rural Nepal, singing, skilled birth

### Introduction

Maternal death has devastating social, economic, and personal consequences.[1] Centers for Disease Control data indicate a continuing rise in maternal mortality ratios within the United States, particularly among black women,[2] while Native Americans have maternal mortality rates >4 times higher than non-Hispanic whites.[3] The maternal mortality ratio in the United States is the highest among high-income countries.[4] Associations with high maternal mortality in the United States context include poverty and poor educational attainment.[1] A potential contributor is that black women may receive inferior care as they are more likely to deliver in hospitals associated with poorer outcomes.[5] Within the Native American community 30% of pregnancies occur for women with no high school diploma.[3]

Part, but not all, of the increase in maternal mortality ratios is likely due to more effective reporting of pregnancy-related deaths.[6] One strategy to reduce maternal mortality has been to focus on near misses as they are more common.[7–9] Maternal mortality is also a major health problem for low-income countries.[4]

The high incidence of maternal mortality in low-income countries to some extent reflects the same etiologies as seen in the United States but with a higher proportion of hemorrhage and hypertensive crises.[4] Among low-income countries, Nepal has been the beneficiary of significant US Agency for International Development investment since the 1950s, particularly focused on improving women's health and the status of women; additionally, Peace Corps volunteers have been in Nepal since 1962. Despite these efforts, Nepal continues to have a high ratio of maternal

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0002-9378/$36.00

https://doi.org/10.1016/j.ajog.2018.09.038

**AJOG at a Glance**

**Why was this study conducted?**
To determine if health messages regarding the importance of antenatal care and skilled birth assistance are effectively transmitted through singing in the limited literacy environment of rural Nepal.

**Key findings**
Singing health messages in rural villages of Nepal significantly improved the knowledge of villagers regardless of educational status, and changed behavior.

**What does this add to what is known?**
Excess maternal mortality is linked to 3 delays: delay in recognizing a problem, delay in transport to a health facility, and delay in the facility before care is given. The first delay is particularly important in illiterate women. This affects disadvantaged people in developed countries such as Native Americans, and rural people in developing countries. This project uses a culturally appropriate singing intervention to bypass the limitations of literacy to provide education on care during pregnancy and childbirth to target the first delay.

mortality, the national estimate is 190 deaths per 100,000 live births. The true figure for rural Nepal is likely to be much higher as most births occur at home and remain unrecorded.[10,11] One reason for underreporting is that culturally, death is considered a private issue. Health care workers are also not expected to discuss taboo issues such as death.[11]

Worldwide, in low-income countries, many factors are known to influence maternal death ratios including maternal age, early marriage, parity, birth spacing, family size, malnutrition, poverty, and poor literacy.[12] In rural Nepal, these factors are further exacerbated by cultural factors. Women move to their husband's household when married and work for their in-laws and husbands. A daughter-in-law is expected to hide her face from her senior male in-laws. There is almost no communication between fathers-in-law and daughters-in-law on pregnancy-related issues, yet the father-in-law and husband usually control the family finances needed to access antenatal care.[13,14] Mothers-in-law make the final decisions with respect to all pregnancy- and childbirth-related issues; these are all considered the domain of women.[15] However, because women do not have the power to authorize decisions associated with financial costs, they may not have the ability to request or obtain the health care, food, and rest required during pregnancy.

The pathway to maternal death in the United States and elsewhere usually involves a series of delays.[16,17] These delays are: (1) a delay in the decision to seek help, (2) a delay in getting to help, and (3) a delay in receiving appropriate care when a health facility is reached. Our intervention program aimed to address the first of these delays in the rural Nepalese setting and specifically to raise the level of knowledge of community members regarding the importance of antenatal checks, supplementary diet, rest during pregnancy, planning for childbirth, and the use of skilled birth attendants. Since all members of remote, rural Nepalese communities contribute to maternal mortality outcomes, the study was designed to include all community members in the program, to help increase awareness of the problems, and the potential solutions.

Changing cultural attitudes is notoriously difficult but, because of the central role of community singing and dancing in Nepalese rural life, it was hypothesized that the community knowledge of antenatal care and the value of skilled birth attendants could be improved with a program of writing song lyrics and singing health messages to traditional music, combined with a wall chart illustrating key points.

## Materials and Methods

Nepalese districts are divided into village development committees (VDCs), the smallest local government units in Nepal. To perform a pre-post study, 4 rural VDCs of the Parbat District were pragmatically selected using a purposive sampling method. The selection criteria included: (1) rurality—2 VDCs selected in each cluster were paired with similar demographic and geographic parameters, (2) accessibility of health services by a road, (3) walking distance to the district headquarters, and (4) intercluster distance was maximized to prevent potential contamination of the intervention. Two adjoining VDCs, Chitre (population 1740) and Ramja Deurali (population 1779), were selected for 1 cluster that together contained 18 villages; and 2 VDCs, Mudikuwa (population 1869) and Falebas Khanigaun (population 1925), that also contained 18 villages, were selected for the second cluster (Figure 1). These 2 clusters were known to be geographically separated by major geological features making communication between the 2 areas unlikely, thus minimizing the likelihood of contamination of the health message outside of the trial intervention area.

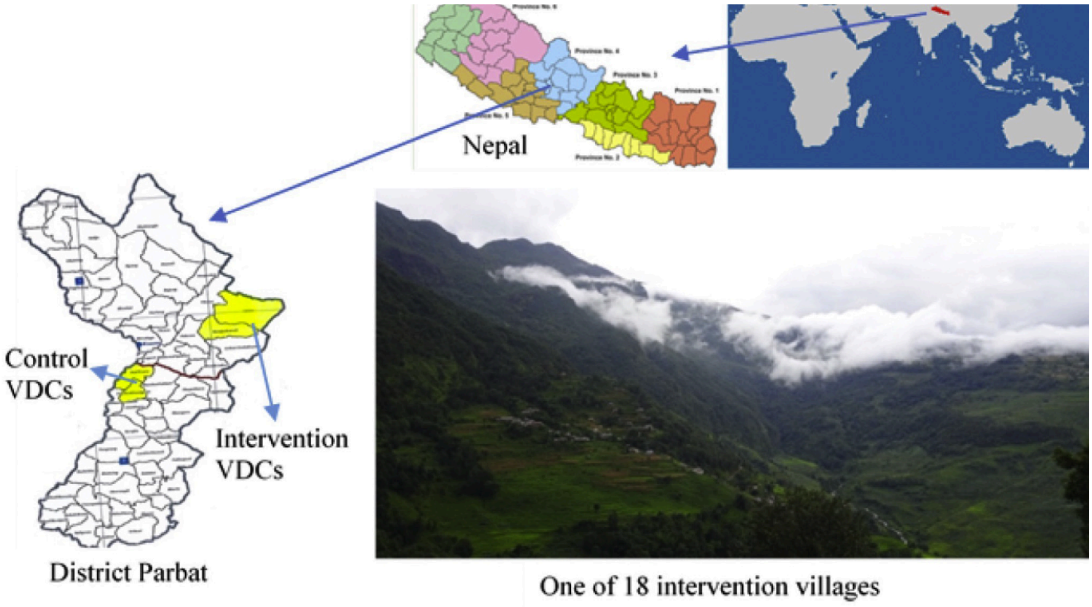
### Ethics

Ethics approval was obtained from the Human Research Ethics Committee of the University of Newcastle (reference no: H-2015-0451, Jan. 22, 2016) and the Nepal Health Research Council (registered no: 92/2016, April 27, 2016). Consent for publication of the results and the images from the institutions and individuals involved has been obtained. All the materials used, evidence of approvals obtained, and the data before, during, and after intervention are available.

### Randomization and masking

All 4 VDCs were asked if they were prepared to be randomized for an intervention. No participant in either cluster was informed of the design of the research; however, the village officials

FIGURE 1
**Nepal and Parbat District maps showing intervention and control areas**




One village within intervention area. People depend on locally grown corn, finger millet, and rice. Firewood is main source of household energy.
*VDC*, village development committee.
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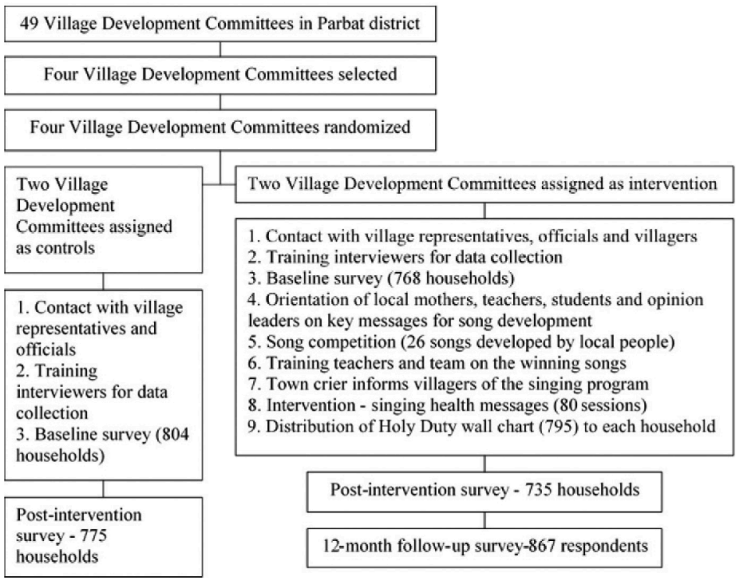
were informed and consent was obtained regarding the planned research activities. Randomization of the 2 regions to either control or intervention was by coin toss (Figure 2). Chitre and Ramja Deurali VDCs were assigned as the intervention cluster with Mudikuwa and Falebas Khanigaun as the control.

## Procedures

Specialist obstetric advice was sought to identify the key health messages to be transmitted and the decision was made to focus on 5 issues: the importance of antenatal visits, the need for supplementary diet, rest during pregnancy, planning for childbirth, and use of skilled birth attendants. A structured online survey questionnaire in the Nepalese language (Prashnawali) was translated by a local language expert. We did not use validated questions; however, we pretested the questions at the University of Newcastle, Australia, using Nepalese students. The questionnaire was further fine-tuned in Nepal based on the feedback from local interviewers during their data collection training. Eight interviewers were selected by the VDCs (2 in each of the 4 VDCs) from within the local community. There was a community preference for female interviewers. Interviewers had completed year-12 education and were assigned for data collection not in their own VDCs but in the adjoining VDCs. Respondents gave written consent with either a signature or fingerprint and were free to decline the interview or terminate it at any time. The baseline surveys were then completed (intervention n = 768 and control n = 804). Male or female heads of household of all the houses involved were approached. One survey was completed at each household by an adult member of the family who was responsible for household finances and decision making.

The same process was used for the postintervention survey (intervention n = 735 and control n = 775). All the heads of the households of the control and intervention clusters were invited for interview. The baseline survey was completed by March 16, 2016. After the baseline survey, the preparations to organize the song competition in the intervention communities started (Table 1) and the events began on June 10, 2016. Immediately following the community intervention, a follow-up survey using the same questions and methods as the initial survey was conducted. At 12 months after the intervention, we carried out a follow-up survey in the intervention cluster only. Due to the absence of robust identification methods and men moving away for work, the respondents may have changed between interviews. For example, if the male of the household was interviewed at baseline, the female head of the household may have been interviewed postintervention and at the 12-month follow-up. In the follow-up

FIGURE 2
**Trial structure**




Design, processes and organisation of the intervention.

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TABLE 1
**Intervention and control protocols**

| Intervention/activities | Control region | Intervention region |
|---|---|---|
| Contact with people and village officials | Yes | Yes |
| Selection of local interviewers | Yes | Yes |
| Training interviewers for data collection | Yes | Yes |
| Baseline data collection | Yes | Yes |
| Intervention: orientation on theme Orientation for local students, teachers, mothers' group members, female community health volunteers, and village officials | No | Yes |
| Song competition | No | Yes |
| Training intervention team on selected songs | No | Yes |
| Engaging town crier to inform villagers of intervention | No | Yes |
| Singing and dancing through villages and distribution of Holy Duty wall chart to all households | No | Yes |
| Postintervention data collection | Yes | Yes |
| 12-mo Follow-up data collection | No | Yes |

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survey, we included questions to measure if participants used the knowledge learned from the program.

Workshops were set up in the intervention VDCs with village officials, teachers, students, mothers' group members, female community health volunteers, opinion leaders, and local politicians (Table 1). Then orientation sessions were organized, which clarified the key message areas for safer pregnancies and childbirth.

## Song competition

The local leaders decided the date, venue, and judges for the competition, and set criteria for the performance of each song. Song competition criteria and health messages were provided through group orientations and schools, and information about the song competition and singing intervention was taken to isolated areas by health workers, volunteers, and the town crier. In schools, internal song competitions were organized to nominate the best songs for the actual competition to be held in the community.

In all, 26 groups of local people in the intervention cluster participated in the development of songs and dances. Each group performed its songs for the community in a festival held in a community hall. The songs were judged by the local teachers and health workers (male and female). The judges created specific judging criteria. The 6 best songs were selected for the next stage of the intervention.

## Promoting awareness through singing health messages

Given the overwhelming participation of the community and the culturally appropriate method of diffusion, the local teachers requested the role of disseminating the health messages throughout the community. The teachers, school management committees, village secretaries, and others decided the composition of the singing teams. In the Chitre VDC, a group of 6 teachers was identified for the singing intervention. The Chitre intervention progression was conducted from July 14–23, 2016. In Ramja Deurali, 1 teacher was nominated to lead the team; other

FIGURE 3
**Group of teachers singing health messages in paddy field**

This was typical setting for community education program. Education sessions through songs were held wherever people were found, in individual houses, in villages and schools, on roads, and in fields where people worked. Photo used with permission.

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members of the group included a traditional singer, adolescents, former students, and 1 local villager. The progression in Ramja Deurali occurred from Aug. 5–12, 2016.

A total of 80 singing sessions were organized covering all the households in the intervention cluster. The sessions were held wherever people were found: in individual houses, in villages and schools, on the roads, and even in the fields where people worked (Figure 3). An estimated 2400 (68.20%) people out of a total of 3519 estimated population heard the health messages. A small portion of the audience attended multiple singing and dancing sessions.

### Distribution of the Holy Duty wall chart

During the singing intervention progression through the villages and farms, each household was provided with a Holy Duty wall chart (Figure 4), which illustrated the key health messages of the songs: the antenatal checkup, the importance of diet (sufficient food) and rest during pregnancy, the importance of planning for childbirth, and use of skilled birth attendants. The chart incorporated pictures of local gods to encourage the villagers to value the health messages and preserve the wall chart. Development of the charts had been completed in consultation with and with the approval of the Nepalese government.

### Outcomes

The primary outcome was knowledge of antenatal care, the importance of rest and diet during pregnancy, planning for delivery, and the value of skilled birth attendants. A secondary outcome was evidence of behavior change linked to the messages within the songs.

### Quality control of data

Survey data were collected verbally by the interviewers who entered the data via tablet computers. Responses were later uploaded to a remote, secure online survey system. Quality checks were undertaken during data upload and cross-checked at the time of data analysis. Cases with missing data were retained in the data set; however, they were excluded from the analysis at the modeling stage of the analysis.

### Statistical analysis

Statistical analyses were conducted using software (SPSS, Version 24; IBM Corp, Armonk, NY). Four subdomains of the knowledge survey were used to create a total score: (1) antenatal care, (2) supplementary diet and rest during pregnancy, (3) planning for childbirth, and (4) need for skilled birth attendants. Due to the difference in the individual subjects in the first 2 surveys, the analysis was conducted as a repeated cross-sectional study.

Differences in the change from baseline in knowledge score between intervention and control regions were assessed using linear regression models. The independent variables in the model included time (pre vs post), group (intervention vs control), and the interaction between group and time. The variance of the comparison groups was not considered equal, therefore, Huber-White sandwich-based estimators were used. Bonferroni corrections were used to adjust for multiple comparisons. Means and percentage change are presented for intervention and control regions at baseline and postintervention with corresponding SD, $P$ values, and 95% confidence intervals.

## Results

A total of n = 1572 (intervention 768 and control 804) participants at baseline and n = 1510 (intervention 735 and control 775) at postintervention completed the survey; no subject who was approached refused to participate (Table 2). At baseline, the control group had 548 (68.2%) females and 256 (31.8%) males compared to the intervention group, which had 584 (76.0%) females and 184 (24.0%) males. The postintervention control group included 554 (71.4%) females and 221 (28.5%) males, while the intervention group had 584 (79.5%) females and 151 (20.5%) males. The participants' ages ranged from 18–97 years with the median age 48 years at baseline and 47 years at postintervention. Knowledge scores were assessed as the number of correct items out of 36 questions.

The intervention was associated with a significant test score increment in the intervention group ($P < .001$). The knowledge of antenatal care ($P < .001$),

FIGURE 4
**Antenatal Holy Duty wall chart**


| Month(s) of pregnancy | Holy duties for safer motherhood | (Photo of mother-in-law and daughter-in-law) We will do.. (Photo of Goddesses) |
|---|---|---|
| Finger showing first month | Photo of Female Community Health Volunteer | Once the pregnancy in known, inform the family members and Female Community Health Volunteer. |
| Fingers showing second month | Photo of balanced diet | Start taking a variety of food (Rice, vegetables, meat maize and milk) every four hours. |
| Fingers showing third month | Photo showing - "No Smoking" and "No alcohol" | Immediate after three months of pregnancy, start taking iron tablets regularly until 45 days after delivery. Smoking and drinking during pregnancy is dangerous. |
| Fingers showing fourth month | Photo of a doctor and balanced diet | Visit health facility for the first antenatal examination. If you experience any health problem during pregnancy, you should visit the health post immediately. It is essential to take additional food during pregnancy. |
| Fingers showing fifth month | Photo of the pregnant women taking rest during pregnancy | Ensure eight hours of rest / uninterrupted sleep every day. Minimise hard/heavy and long hours of work. Make sure you have rests every four hourly with weight off the feet. |
| Fingers showing sixth month | Photo of a doctor and interaction with Female Community Health Volunteer | Discuss and finalise the plan for the birth together with father-in-law, mother-in-law, husband and Female Community Health Volunteer and make the second antenatal visit. |
| Fingers showing seventh month | Photos – pregnant women being carried out on the back to take to the health post | The following plans are very important for safer childbirth - Save or arrange money for childbirth. Make a plan for transportation to the health facility. Confirm with the health institution for skilled care at delivery |
| Fingers showing eighth month | Photos of a doctor and mobile phone | Visit to health institution for the third antenatal check-up and finalise the transportation and the plan for the childbirth. Inform the health facility in advance. |
| Photo of grandmother and a newborn baby | Photos of health post and a doctor | Visit for the fourth antenatal visit. Make sure that you have money, people to carry the pregnant woman or other transportation means. Ensure skilled delivery. |

Holy Duty wall chart developed to help family members understand their specific roles during 9 months of pregnancy. Photo used with permission.
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supplementary diet and rest during pregnancy ($P < .001$), and planning for childbirth ($P < .001$) improved. The total knowledge score in the intervention group nearly doubled from 11.60–22.33/36, a 92.50% increase. There was almost no change in the control group.

The greatest improvement in knowledge ($P < .001$) was observed among the illiterate cohort ($P < .001$) (Figure 5). For example, the women with no education improved from 7.54 at baseline to 20.62/36 postintervention ($P < .001$). Women with higher education improved from a baseline of 15.86 to a postintervention score of 24.17/36 ($P < .001$). A similar response was observed in the knowledge among men with no education, which improved from a baseline of 7.43 to a postintervention score of 19.55/36 ($P < .001$); men with higher education improved from a baseline of 16.77 to a postintervention score of 24.68/36 ($P < .001$).

We also related the income of participants to knowledge scores (Figure 6). Participants were divided into 2 groups: those with an annual income of ≤299,999 Nepalese Rupees (US$2600) were categorized as the low income, while those earning >300,000 Nepalese Rupees were grouped as high income. Low-income women scored 12.58 at baseline and 22.31/36 at the postintervention survey ($P < .001$). The high-income women scored 12.58 at baseline and 22.94/36 postintervention ($P < .001$). A similar trend was observed among males: low-income men scored 10.88 at baseline and 22.14/36 ($P < .001$). While high-income men scored 14.11 at baseline and 23.01/36 postintervention ($P < .001$) (Figure 6). The improvement in the knowledge among males and females was similar with no gender-specific pattern of change.

The 12-month follow-up data on the questions that were common to the baseline and postintervention survey (21 questions) indicated that the mean score was 8.38 at baseline, 15.29 at postintervention, and 15.34 at the 12-month follow-up survey. Participants who found the songs helpful were more likely to indicate they provided additional food ($P < .016$), rest ($P < .004$), and planned properly for a birth ($P < .005$). The majority of participants (63.9%) indicated that they provided information learned in the intervention to their neighbors and friends, with 357 (41.3%) of the participants still singing the songs from the program.

## Comment

Our singing and dancing intervention was associated with a doubling of the knowledge score regarding pregnancy care from 11.60–22.33 out of a possible 36 marks. This increase was statistically significant and much greater than the mean 0.78 marks increase observed in the control group. The intervention and control villages had similar rurality and

TABLE 2
**Baseline and postintervention knowledge related to key message areas and delivery care**

| | Control | | | Intervention | | |
|---|---|---|---|---|---|---|
| Knowledge mean (SD) | Baseline n = 804 | Postintervention n = 775 | Increase | Baseline n = 768 | Postintervention n = 735 | Increase |
| Importance of antenatal examination, out of 7 | 3.66 (1.6) | 3.86 (1.36) | 5.46% | 2.12 (1.74) | 4.89 (1.55) | 130.66% |
| Importance of supplementary diet and rest during pregnancy, out of 9 | 5.43 (1.3) | 5.79 (1.17) | 6.63% | 3.71 (1.92) | 6.84 (1.63) | 84.37% |
| Importance of childbirth planning, out of 8 | 4.04 (1.23) | 4.18 (1.2) | 3.47% | 2.81 (2.23) | 5.50 (1.54) | 95.73% |
| Importance of delivery care, out of 12 | 4.35 (2.21) | 4.43 (2.06) | 1.84% | 2.95 (2.21) | 5.09 (1.81) | 72.54% |
| Overall knowledge, out of 36 | 17.48 (4.4) | 18.26 (3.9) | 4.46% | 11.60 (6.6) | 22.33 (4.97) | 92.50% |

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demographic characteristics. However, after data analysis, differences between the intervention and control groups were noted in the initial knowledge of respondents regarding the importance of antenatal visits, supplementary diet, rest during pregnancy, and the importance of planning for childbirth. Respondents in the control cluster had a higher level of knowledge on these issues prior to the intervention. Slight differences existed between the control and intervention clusters in terms of ethnicity and socioeconomic status. In the control area there was a college for higher education and a private hospital, which were not present in the intervention cluster. These factors might have contributed to the higher knowledge level observed in the baseline survey of the control group compared to their intervention counterparts. The postintervention scores were more tightly clustered around the mean indicating that a large proportion of the study population had acquired the key health messages contained in the singing and dancing program. In all subdomains, the intervention group nearly doubled their score from baseline.

Our data indicate that prior to the intervention knowledge of antenatal and delivery care was equally poor in both men and women. Further, the groups that benefited most from our intervention were the illiterate women and men whose knowledge levels increased to be very similar to those seen in the most educated members of the society. Wealth had less of an effect than educational

FIGURE 5
**Total knowledge score by education and gender**

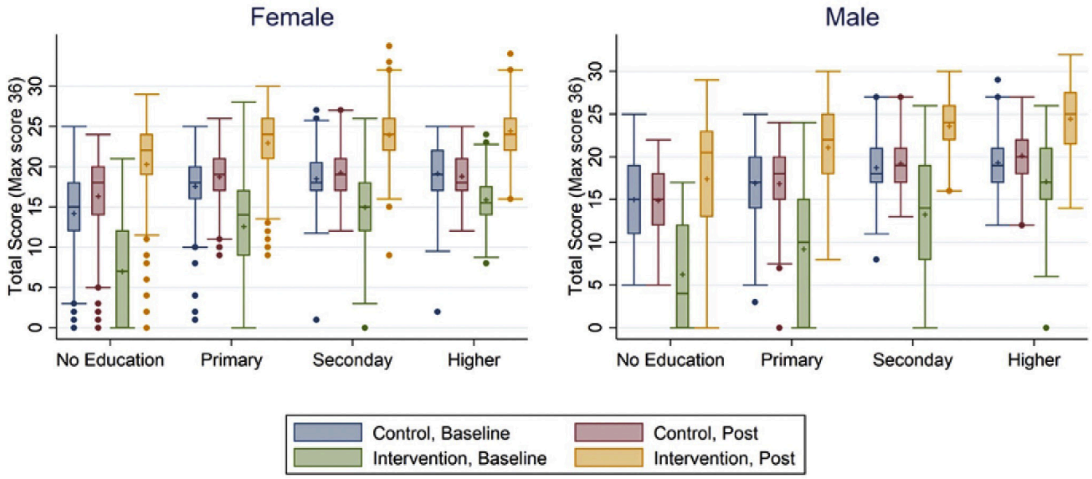


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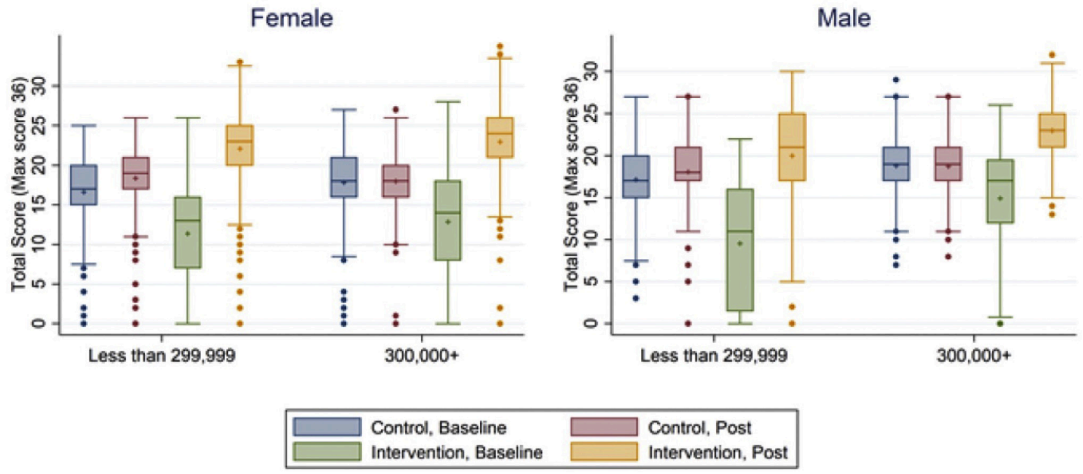
FIGURE 6
**Total knowledge score by income and gender**

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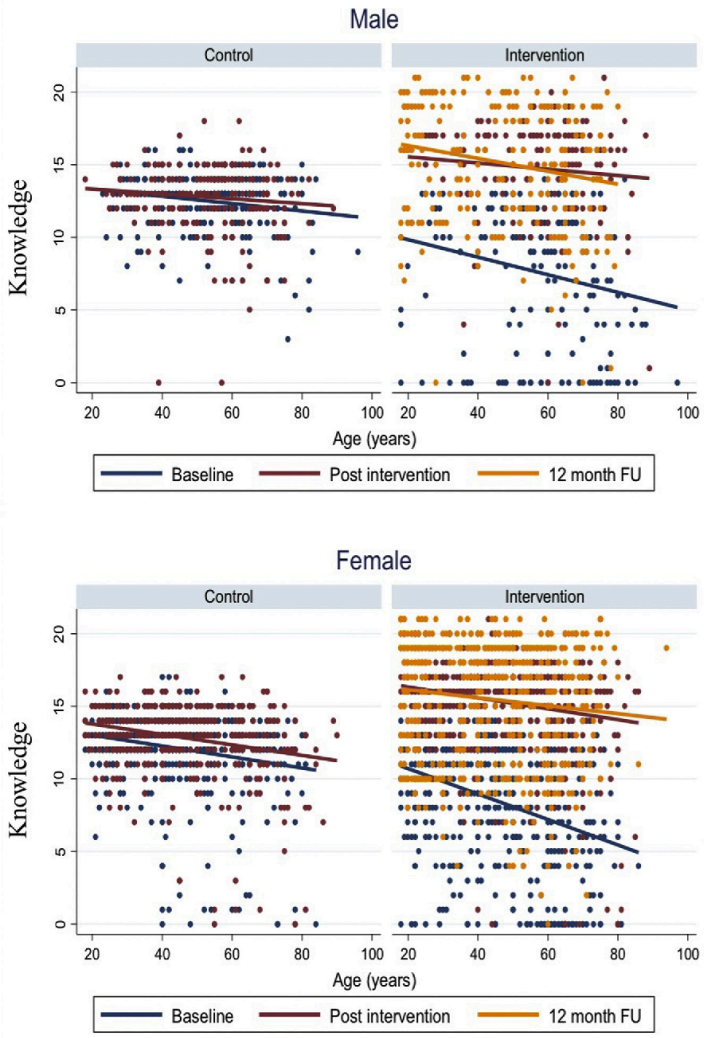
attainment on the levels of knowledge of community members. Both young and older members of the community improved their knowledge scores. We were surprised that older community members, both men and women, were prepared to change long-held beliefs (Figure 7).

The key health messages were established by expert opinion supported by the literature. Antenatal visits are thought to be critical in predicting the likelihood of complications enabling preventative action.[18,19] At least 4 antenatal visits at the fourth, sixth, eighth, and ninth month of pregnancy are recommended by the Nepalese Ministry of Health.[20] However, only 50% of the pregnant women in Nepal have the recommended visits and only 36% of women had skilled assistance at birth.[21] The nutritional state of Nepalese women in rural settings is known to be compromised, and severe anemia and other malnutrition-related complications are common.[22] A wide variety of foods (rice, vegetables, meat, and maize) during pregnancy are known to positively influence the size and health of the baby,[23] while women who have an inadequate diet during pregnancy experience a higher rate of poor pregnancy outcomes.[24] Working long hours and lifting heavy weights during pregnancy is associated with preterm birth and retarded fetal growth.[25] Disturbed sleep and lack of adequate rest is also known to be associated with poor pregnancy outcomes.[26] Finally, skilled care at birth is associated with significant reductions in the risk of complications and death of mother and baby.[27,28]

Using health songs to disseminate messages regarding pregnancy and childbirth in the community was a new practice in the Nepalese rural setting. The program was successful in engaging and bringing the community together to achieve a coordinated effort to organize both the song competition and the musical procession effectively (Video). The intervention involved activities such as rapport building, facilitating the community to take the leading role, and engaging the whole community and were time-consuming but effective. Our intervention was designed to improve knowledge about pregnancy and birthing care among the individuals who would be decision makers regarding the acceptance of antenatal care in a rural Nepalese community. In the pregnancy context 5 people are particularly important: the mother, father-in-law, mother-in-law, husband, and the female community health volunteer; a successful outcome requires all 5 to be involved in childbirth planning. Male engagement, in particular, is essential because of the involvement of men in managing issues such as seeking skilled care, finance, and transportation.[24] Our intervention therefore targeted the first of the 3 delays that are associated with maternal death. In future work we will endeavor to tackle the delays associated with transport and the timely access to effective treatment on arrival at a health care facility.

Community engagement in health interventions is thought to be important in embedding knowledge into local cultures.[25] We could not find any prior evidence regarding the use of programs

FIGURE 7
**Total score by gender and age: baseline, postintervention, and at 12-month follow-up**




Knowledge improved in intervention population at postintervention and was retained at 12-month follow-up (FU).

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using singing and dancing to transmit obstetric health messages in low-income environments that have been robustly assessed. In Moyamba, Sierra Leone, songs created by students and performed as drama were found to be associated with a reduction in teenage pregnancy[27]; and in Bangladesh, a village theater used to educate the community about eclampsia was effective in maintaining the interest of the audience and improving knowledge.[23] Previous studies using cultural media regarding other health problems have demonstrated positive results, for example, in Papua New Guinea, a trained theater group was used to educate the school community on local health problems and a high level of engagement was demonstrated.[22] The findings of our study echo evidence from India and Pakistan in which hard-to-reach families were accessed for polio eradication programs through folk media interventions.[28,29] Published data suggest that the more the interventions are designed and constructed with consideration given to local culture, the greater the likelihood of success in long-term behavioral change.[30]

Our study supports the use of folk media especially in illiterate and financially deprived communities.[31] Social networks strongly re-enforce cultural behaviors. In this study we were able to expose almost all members of the community to new ideas on the management of pregnancy at the same time; this may have generated a new cultural norm within the community leading to the preservation of the new knowledge over the 12-month period.[32]

In The Netherlands, a significant rise in maternal mortality ratio has been observed from 9.7 per 100,000 livebirths (1983 through 1992) to 12.1 (1993 through 2005). In addition to the direct causes such as thromboembolism, (pre) eclampsia, sudden death in pregnancy, obstetric hemorrhage, sepsis, and amniotic fluid embolism, indirect deaths caused by an increase in cardiovascular disorder also increased. An especially high maternal death ratio was recorded among the non-Western immigrant population. These populations were at high risk of maternal death as they were provided with substandard care.[33] The maternal mortality ratio in the United States, particularly among African American women is rising.[2] These data indicate that even in developed countries, the standard care designed for the general population may not address the health needs of populations that are from different sociocultural, economic, and geographic backgrounds. Therefore, programs need to specifically address the needs of disadvantaged population subgroups such as Native American women.

The multicultural nature of the US population may require the design of group-specific maternal health programs to address the rising maternal mortality ratio.

The 12-month follow-up data indicate a sustained intervention effect of improved knowledge test scores after 12 months (Figure 5). This knowledge is likely to be a crucial intermediary in the pathway to improving maternal mortality by reducing the first of the delays leading to maternal death, the delay in initial decision making. In the 12-month follow-up, we also document that villagers changed behavior based on the knowledge learned: informing neighbors, relatives, and friends of the appropriate care of pregnant women including providing rest, additional food, and the need for antenatal care.

This report offers evidence to policy makers, planners, strategists, program managers, and researchers to consider the local context and the importance of community embedding and community leadership in increasing knowledge outcomes on health issues. The experience of using local resources, for example, talent to develop songs, musical instruments, performers, and leadership in organization of the community education program, not only made the intervention low-cost but also implanted the concept that the community itself can lead and achieve sustained improvements.

Some limitations of the study should be noted. Our study addressed knowledge change but was not designed to detect potential consequential changes in maternal mortality. Although there was no loss of knowledge at 12-month follow-up, it is unknown how long the acquired knowledge will be retained within the community and whether it will translate into altered maternal health outcomes. Similarly, the intervention and control group turned out to be not completely comparable, with a difference in knowledge preintervention.

## Evidence before this study

Worldwide, maternal health is poor in rural settings. This is also true of rural Nepal where maternal mortality rates are double the national Nepalese estimates (190/100,000 live births). Poor health infrastructure, a nonsupportive sociocultural environment for pregnant women and tough topography combine to challenge maternal health development efforts as does a lack of awareness of the measures needed for safer pregnancy and childbirth. Lack of community ownership and knowledge regarding existing health services also leads to poor utilization of such programs. When preparing for this project, little evidence was available regarding the impact of engaging a rural Nepalese community in the design, development, and execution of health promotion programs that are both culturally appropriate and led by local people.

## Added value of this study

The whole program for this study in rural Nepal was discussed, developed, and implemented with all sections of the community under the leadership of the local people. As singing plays a central role in rural lives in Nepal, in this study, key maternal health messages regarding safer pregnancy and childbirth were promoted through song. This study demonstrates that community education programs that encourage local people to engage in the design, development, and implementation of the programs suitable to their local culture can transmit essential knowledge regarding antenatal and delivery care to illiterate members of a community.

## Implications

The result of the research has already been considered by the government of Nepal. The government announced funding for an air ambulance specifically for evacuations of obstetric emergencies to address the second delay: transport to a suitable facility. The government has also announced increased financial incentives for institutional delivery, 4 antenatal visits and improved recording and reporting of maternal mortality. The findings of this study will facilitate planning and implementation of programs to reduce maternal mortality in settings with low levels of literacy and poor use of health services. This report offers evidence to all policy makers, planners, strategists, program managers, and researchers to consider the local context and the importance of community embedding and community leadership in improving health knowledge transfer.

## Conclusions

This study demonstrated that promoting pregnancy and birthing health care messages through culturally appropriate songs and poster distribution was an effective means of improving knowledge in a low-literacy environment. This increased knowledge should help the women of those villages to access better care during pregnancy and childbirth, resulting in safer pregnancies and childbirth. The successful outcomes of this study can be used to encourage other rural areas and minority groups to use tailored, culturally appropriate models of health information transfer. ■

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# Chapter Six B

## Abstract

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Title: Use of Songs Leads to Long-term Improvement in Knowledge of Antenatal Care in a Predominantly Illiterate Community

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**Introduction:** In the rural villages of Nepal, the maternal mortality ratio is amongst the highest in the world. The reasons for this are cultural and include illiteracy and lack of knowledge of the needs of women during pregnancy. The death of a woman in childbirth is simply accepted. Culturally, singing and dancing are part of Nepalese daily life. We hypothesized that health messages regarding the importance of antenatal care might be effectively transmitted by songs in the limited literacy environment of rural Nepal.

**Methods:** We randomly grouped four rural Village Development Committees comprising 36 villages into two (intervention and control) clusters. In the intervention group, community members were provided with key health messages regarding

pregnancy and childbirth, and different local groups were invited to write song lyrics incorporating the messages to accompany popular melodies. The local groups presented their songs and danced in a community festival organised and judged by the community. The winning songs were performed by the local people in a song and dance progression through the villages, houses and fields. A wall chart with key health messages was also provided to each household. Knowledge of household decision makers (senior men and women) was assessed before and after the intervention and at 12 months using a structured questionnaire in all households. Each stage of the process was video recorded.

**Results:** Baseline and post-intervention survey (intervention n=735, control n=775), and at 12-month follow-up (n= 867) data was collected. Knowledge scores were number of correct items out of 36 questions at baseline and post-intervention and 21 questions at follow-up. At post-intervention, knowledge doubled in the intervention group from a mean of 11.60/36 to 22.33/36, an increase of 10.69 [9.97, 11.41, P<0.001], with no significant change in the control population [17.48/36 to 18.26/36, 0.28, 1.33]. Improvement was greatest amongst the most illiterate members of the community [6.8, 19.8, P<0.001]. At 12-month follow-up, there was no loss of knowledge.

**Conclusions:** The use of singing bypassed the limitations of literacy in communicating health messages that are key to improving maternal mortality in this rural setting within a developing country. The improvements were maintained without further intervention for 12 months. With appropriate sociocultural adaptation to local context, this low-cost method of community education may be applicable to improving maternal health outcomes in other low resource communities.

# Chapter Seven
# Review of Safe Motherhood Policy (1998), Nepal

(Manuscripts submitted for publication to WHO South-East Asia Journal of Public Health- Under Editorrial Review)

(Verbatim)

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**Abstract**

**Objective:** To provide evidence for the Nepalese government to develop a new Safe Motherhood Policy.

**Methods:** A narrative review of the Safe Motherhood Policy (1998) was undertaken regarding its effectiveness and relevance to the current situation. A narrative analysis of current programs and outcomes was also carried out on the basis of the Department of Health Services' annual reports.

**Results:** We identified deficiencies in the Safe Motherhood Policy. The changes in the demographic composition of Nepal, particularly an increase in the number of young people with increased reproductive and sexual health needs, and political changes in the structure of local, provincial and national health institutions indicate the need for policy change.

**Conclusion:** The policy environment has changed since the Safe Motherhood Policy was developed in 1998. The policy, therefore, needs to be developed to drive current health strategies and programs. Further research on safe motherhood issues may be helpful.

**Keywords:** safe motherhood, policy, review, Nepal

## Introduction

The Safe Motherhood Policy (1998) is a national policy document which aims to reduce mortality and morbidity during pregnancy, childbirth and the postnatal period through the adoption of health and health-related measures. It is both a health policy and, being developed for the public good, a public policy. It is also a regulatory policy as it limits or compels certain types of behavior related to maternal health. The Safe Motherhood (1998) was developed as both a reactive and proactive policy.

The Safe Motherhood Program was first introduced in 1994 in ten districts (Okhaldhunga, Sunsari, Nuwakot, Dhanusa, Baglung, Rupendehi, Surkhet, Banke, Dadeldhura and

Kailali), representing the five Development Regions. The program was further expanded to five more districts (Ilam, Makawanpur, Gorkha, Dang and Jumla) in the fiscal year 1998/99 with a view to developing a model of care for improving safe delivery services and maternal outcomes throughout the country.

The National Health Policy 2014 reviewed and replaced the National Health Policy 1991. To honour its national and international commitments, the Government of Nepal initiated health programs such as the Safe Motherhood Program, a free health care program, including social security programs, targeting certain population subgroups. The program has improved the proportion of births attended by skilled birth attendants from 19% in the year 2006 to 36% in 2011; 50% in the year 2013[1] and 58% in 2016.[2] Under the Social Security Program (SSP) the Ministry of Health and Population also provides subsidies for treatment of cancer, heart disease, kidney problems, Parkinsonism and Alzheimer's disease.[3]

The health sector has received greater attention over the past twenty years and diseases such as respiratory diseases, typhoid, whopping cough, chickenpox, tuberculosis, malaria, diarrhoea, filariasis, diphtheria, tetanus, kala ajar, trachoma, and Human Immunodeficiency Virus (HIV), are declining. Nepal has eradicated smallpox and is nearly free from polio. Maternal and neonatal tetanus have been eliminated.

Given its high maternal mortality ratio, Nepal is struggling to identify cost effective and practical ways to reduce maternal deaths and improve maternal outcomes. The Safe Motherhood Program addresses three delays causing maternal death: a) delay in decision making; b) delay in reaching a health facility; and c) delay in accessing care at the facility.

In addition to improvements in health service delivery, the government created regulatory bodies responsible for monitoring health services and providing quality human resources including the Nepal Health Professional Council (NHPC); the Nepal Medical Council (NMC); the Nepal Pharmacy Council (NPC); the Nepal Nursing Council (NNC); and the Nepal Health Research Council (NHRC). Nepal also promoted international cooperation in the health sector.

Policies are reviewed if the context, the participants (individual, group and organisational), the policy environment or the context of the policy issues have changed.[4] Since the introduction of the Safe Motherhood Policy in 1998, there have been many fundamental changes in the context, participants, and the policy environment in Nepal. The government has moved from a Monarchy to Federal Republic; health policies have been changed; and the structure of the health institutions and their service delivery protocols have been updated. Most importantly, maternal mortality remains high, so the current policy clearly requires improvement. It is therefore timely to review the policy statements, directives, objectives, strategies and their relevance in the local, national and international context. The unmet reproductive health needs in Nepal, Nepal's constitutional directives, and government commitments to international declarations and conventions and particularly to achieve the Sustainable Development Goals (SDGs), all point to a need to review the existing Safe Motherhood Policy (1998).

This review aims to provide evidence for the Nepalese government to a) revise the Safe Motherhood Policy (1998); b) plan and allocate resources based on the evidence; c) develop safe motherhood programs based on the local, national and international context; and d) improve maternal health outcomes in Nepal.

## Methods

We carried out a narrative review and analysis of the Safe Motherhood Policy (1998) which focussed on the effectiveness and relevance of the existing policy. An analysis of the current programs and outcomes was also carried out. The following methods were used: 1) a review and revision of the policy document (the policy statement, directives, objectives, targets and strategies) with regards to the effectiveness and relevance; 2) a review of current programs; and 3) a review of current program outcomes.

The policy review document, recommendations and a companion policy brief will be delivered to the government of Nepal.

## Review rationale

The National Health Policy 2014 has provided a positive policy environment to achieve further improvements in maternal health issues. While there has been progress in some key areas to improve access to health services, challenges remain in reaching out to remote, marginalised or disadvantaged populations, particularly in maternal health service delivery. For example, the under-five child death ratio is higher in the lowest wealth quintile (75) as compared to highest wealth quintile (36), and it is higher in rural (64) than urban (45) areas. Similarly, the under-five death ratio is higher in the Far-West (82) and Mid-West (73) as compared to Western (57) Central (60) and Eastern (55) Development regions.[5]

Since the policy was adopted there have been continuing changes in population. For example, the population of Nepal was 23,151,423 in 1995 but this figure increased to 29,624,053 in the year 2018[6]. The sociodemographic structure of the population has also changed. For example, young people (aged 15 -49) now make up 32.5% and adolescents 23.6% of the total population.[7] This large cohort of younger people has an increased the

need to address sexual and reproductive health issues. The International Conference on Population and Development (ICPD), Cairo, 1994, was an important milestone in addressing the issues of young people, particularly reproductive health and safer reproductive practices, and the Government of Nepal is a signatory to the ICPD program of action (Ministry of Population and Environment, Nepal Population Report 2004).

A change in the educational status of young people (74% literate) significantly changes their sexual and reproductive behaviour.[8] Policies that are related to their behaviour, particularly reproductive health, must therefore be constantly improved as the cohort changes. Although early marriage is traditional in Nepalese societies and other South Asian countries, particularly in rural settings[9, 10], a large percentage (73.95%) of young people are now still single, thus indicating an important policy intervention to manage potential high-risk sexual behaviour.[8] Delayed age at marriage among males is on the increase.[11] The changing trend towards urbanisation and late marriage[12], increases the need to update Reproductive Health Policies, particularly the Safe Motherhood Policy, which are essential to address pre-marital sexual and reproductive health needs.[13] Pre-marital sexual behaviour increases the risks of sexually transmitted infections and unwanted pregnancies which may lead to unsafe abortion.

**Current programs:**

1. Birth preparedness: The slow paced improvement in maternal outcomes, particularly maternal mortality, in low resource settings is usually blamed on a poor contextual understanding of health seeking practices and attitudes.[14] Changes made to medical issues alone are not sufficient to improve outcomes.[15] Birth preparedness programs should address the sociocultural barriers faced by rural women that are as important as medical ones.[16] These programs therefore need to be guided by an updated policy.

2. Rural ultrasound: It is insufficient to run the rural ultrasound program in only 12/77 districts in Nepal.

3. Reproductive health management: Pelvic organ prolapse is a common reproductive health morbidity of women in Nepal which also has social consequences. In 2015/16, more than 14,600 women were screened and 3,374 were diagnosed of having pelvic organ prolapse.[17] Obstetric fistula also affects many women from poorer communities and significantly impairs their quality of life. The government has allocated funds for free screening for obstetric fistula and pelvic organ prolapse and free surgical services[17]; it is essential to access all women in remote districts. Programs and strategies should be based on updated policy directives.

4. Human resources management: The provision of important health care services such as skilled care at birth should not be dependent on temporary staff. This risks the continuation of skilled delivery services, retention of staff, service utilisation and the image of the public health services. It is therefore essential to develop a national consensus for improved resource allocation.

5. Expansion and quality improvement of service delivery sites: The expansion of these service sites has depended on the provision of funds to contract short-term staff locally. At the end of fiscal year 2015/16, comprehensive emergency obstetric care services, including neonatal care services, were established in 72 districts of which only 60 functioned throughout the year.

6. Emergency referral funds: It is estimated that 15% of pregnant women will develop serious complications during their pregnancies and deliveries[17] and 5 to 10% of them will need caesarean section deliveries (WHO, 2015) to avoid deaths or long-term morbidity. Where there is difficult geographical terrain and comprehensive emergency obstetric care is unavailable, it is critical that these women are referred to appropriate centres. The referral system should be strengthened with staff and essential logistics. A good

communication system is required to use emergency referral funds effectively and ensure information about them reaches those in need.

7. Safe abortion services: Of all the abortions in Nepal, only 42% were provided legally at government approved service sites (CHREPA 2016). This indicates the need to make safe abortion services available, accessible and affordable to all women with unwanted pregnancies. The Safe Motherhood Policy should direct programs to educate communities and ensure family planning is available to reduce unwanted pregnancies. Although the provision of manual vacuum aspiration service sites and medical staff is important, community health promotion programs are essential.

8. Obstetric first aid orientations: It is important to train paramedics in obstetrics first aid and for the government to provide a trained workforce with basic medical supplies available throughout the year at the community-levels.

9. Nyano Jhola (warm bag) program: This program encourages rural mothers to use institutional services, but it should also educate the community to help women to use these services. The program was interrupted due to financial constraints, but the Ministry of Health allocated a budget for 2015/16 due to popular demand and it continued thereafter.

10. Aama (Mother) and newborn program: In 2012, the program to provide incentives to complete four antenatal visits was merged with the Aama Program. In 2015/16, the Free Newborn Care Program (introduced in FY 2014/15) was merged with the Aama Program with the following provisions: women delivering their babies in health institutions would receive a transport incentive for institutional delivery and a cash payment immediately after institutional delivery (Nepalese Rupees 1,500 in mountains, 1,000 in hills and 500 in Terai (plain) districts). The incentive for 4 antenatal visits is a cash payment of Nepalese Rupees 400 is made to women on completion of 4 visits at 4, 6, 8 and 9 months of pregnancy. This is a very important program and reflects the government's

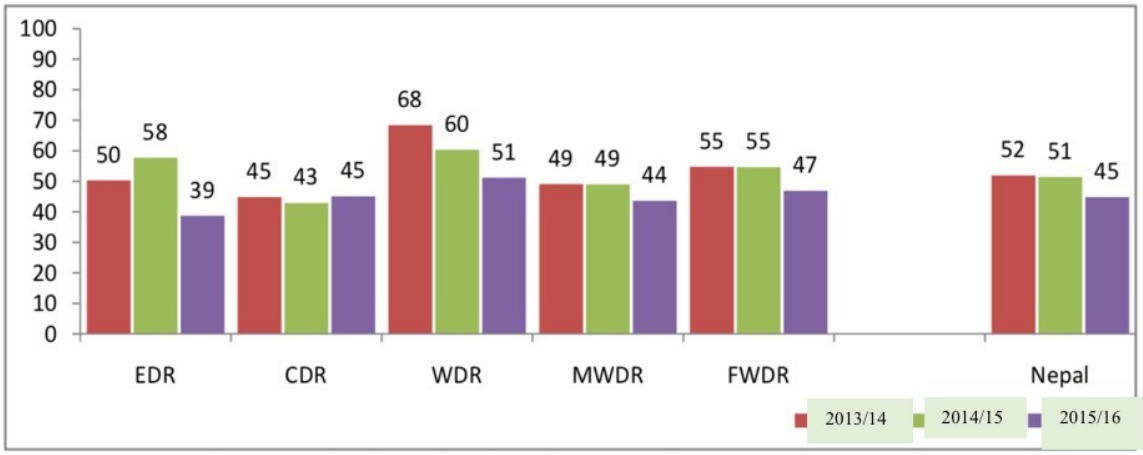
commitment to improve maternal outcomes in addition to the ratio of institutional delivery. It is essential this provision be an integral component of the Safe Motherhood Policy. The Government has made policy decisions in 2018 to double the amounts given as an incentive for institutional deliveries and to complete the recommended antenatal visits.

11. Maternal and perinatal death surveillance & response: The improved availability of services in Nepal over the past 20 years has reduced the maternal mortality ratio (MMR) substantially but it remains a challenge to meet the Sustainable Development Goal (SDG) of 70 deaths per 1,00,000 live births by 2030. The system records routine identification, notification, quantification and determination of causes and avoidable factors of all maternal deaths, as well as using this information to decrease preventable maternal deaths. As this is in initial phase, there is a need to document the process of implementation to identify issues and challenges. It is also very important to analyse the information and data received from the process to identify the socio-demographic characteristics of women who are dying, the cause of death, and any avoidable factors, to implement appropriate action plans. This information will be vital for strengthening the program for further expansion and to reduce preventable maternal mortality.

**Evaluation of the policy based on the current status of program outcomes**

1. Antenatal care is critically important[18-20] and antenatal care visits with a skilled health worker prevent maternal complications and mortality.[21-24] However, the trend for women making four antenatal visits, as recommended by the government in Nepal, is decreasing (Figure 1). The national figure in 2016 fell by 6% compared to 2015. This trend is common across all the development regions of Nepal except the Central Development Region.

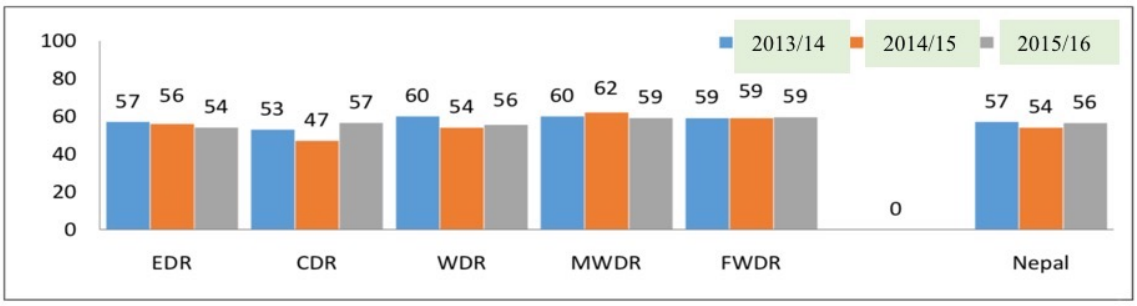
Regional and national trends of percentage of pregnant women with four antenatal care visits (as per protocol) among expected pregnancies (2013/14 - 2015/16)




EDR= Eastern Development Region, CDR= Central Development Region, WDR= Western Development Region, MWDR= Mid-western Development Region, FWDR= Far-western Development Region
Source: Annual report, Department of Health Services, Nepal 2016/17
Figure 1

2. Delivery attended by a skilled birth attendant is not improving: A delivery attended by a skilled birth attendant is one of the key health indicators of the safe motherhood program. A total of 56% of mothers were attended by SBAs in the year reported (2014/15). Although this is a 2% increase on the previous year, it is 1% less than the preceding year. The trend of using SBAs at birth across the region is decreasing, except in the Central Development Region, the region with the national capital (Figure 2).

Percentage of deliveries attended by SBAs as percentage of expected live births (2013/14 - 2015/16)

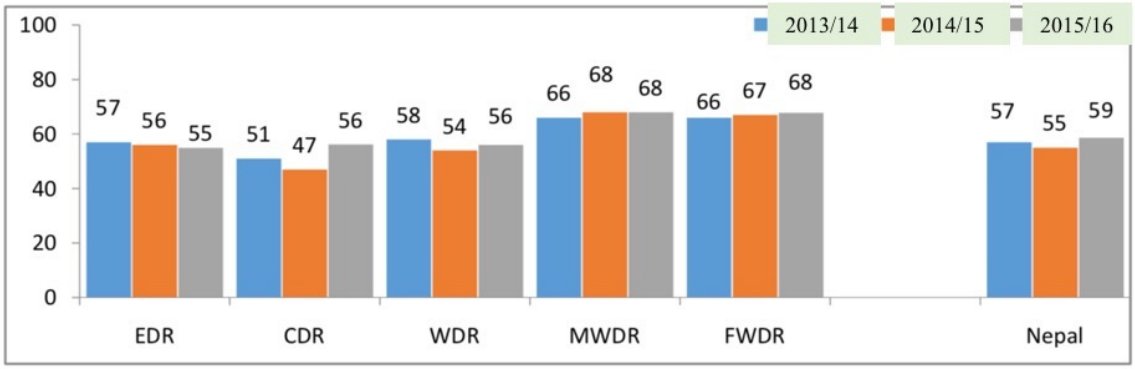



EDR= Eastern Development Region, CDR= Central Development Region, WDR= Western Development Region, MWDR= Mid-western Development Region, FWDR= Far-western Development Region
Source: Annual report, Department of Health Services, Nepal 2016/17
Figure 2

3. The trend for institutional delivery is improving, but very slowly (Figure 3) and remains unsatisfactory. A total of 59% of deliveries were conducted in the year reported. The figure is an increase of 4% compared to the preceding year, but only a 2% increment

compared to the report for 2013/14. There are variations in the percentage of institutional deliveries across all regions except the Eastern Development Region, which shows a continually decreasing trend in all the years reported: 57% in 2013; 56% in 2014; and 55% in 2015.

Percentage of institutional deliveries as percentage of expected live births (2013/14 - 2015/16)




EDR= Eastern Development Region, CDR= Central Development Region, WDR= Western Development Region, MWDR= Mid-western Development Region, FWDR= Far-western Development Region
Source: Annual report, Department of Health Services, Nepal 2016/17
Figure 3

4. Postnatal care is decreasing: Postnatal care is as important as care during pregnancy and childbirth. However, the annual report of the Department of Health services[17] demonstrates the trend for postnatal care decreased in 2016 by 1% compared to the previous year (Figure 4). The data shows that postnatal care in the Eastern Development Region decreased by half in the year 2016 compared to the data reported in 2014. All other regions, except Eastern, are stable in providing three postnatal care visits compared to the corresponding previous year.

Percentage of three postnatal care as per the protocols, percentage of live births (2013/14 - 2015/16)


EDR= Eastern Development Region, CDR= Central Development Region, WDR= Western Development Region, MWDR= Mid-western Development Region, FWDR= Far-western Development Region
Source: Health Management Information System (HMIS) as cited in Annual report, Department of Health Services, Nepal 2016/17

Figure 4

In conclusion, given these data, the Safe Motherhood Policy has to be updated in all essential sections, both in its content and context. For example, the policy statements, directives, objectives, targets and strategies need to be updated based on the current local, national and international context.

During the fiscal year (FY) 2016/17, the national average for attendance at the antenatal care fourth visit, as recommended by the government, has increased to 52%. Similarly, the percentage of institutional deliveries has increased to 57% in FY 2016/17 as compared to 55% in FY 2015/16. However, the percentage of mothers receiving their first postnatal care visit at a health facility as a proportion of expected live births decreased to 51% in FY 2016/17 from 57% in the year 2015/16. During the FY 2016/17, a total of 96,417 comprehensive abortion care (CAC) services were provided. Of this, a total of 44% of women received a medical abortion service and 70% of women received post-abortion family planning services. The contribution of Long Acting family planning services out of the total post-abortion family planning appeared to be only about 16%, a 2% increase in the FY 2016/17 over the previous year (2015/16).[17]

**Results**

We found that the policy statements in the current Safe Motherhood Policy need to be updated to meet the current institutional arrangements. For example, the health institutions established at the Village Development Committee, District, Zone and Development regions no longer exist.

We found the following policy targets to be no longer relevant or outdated: No 1 *"reduce maternal mortality rate from 850 per 100,000 live birth to 750 by 1996 and to 400 by the year 2000"*; No 2 *"increase contraceptive prevalence rate (CPR), with particular focus on spacing methods, from 24% to 30% by 1996 and to 38% by the year 2000"*; No 3 *"increase the coverage of antenatal care services from 18% to 25% by 1996 and to 50% by the year 2000"*; No 4 *"Ensure that at least 25% of all deliveries are attended by trained health workers by 50% by the year 2000"*; No 5 *"Increase the number of first level referral hospitals with capacity to provide essential obstetric functions from the present number of 14 to 24 by 1996"*; No 6 *"Reduce anaemia (i.e., Hb<11gm%) in pregnant women from 78% to 70% by 1996 and to 50% by the year 2000"*; No 7 *"Improve Tetanus Toxoid (TT) immunization coverage among women of child bearing age to 90% by the year 2000"*; No 8 *"Increase the enrolment of female students in primary school from 54% to 76% by 1996 and to 100% by the year 2000";* No 9 *"Ensure the completion of primary education by girl children from the present estimate of 27% to 55% by 1996 and to 70% by the year 2000"*; and No 10 *"Increase the female literacy from the present rate of 21% to 38% by 1996 and to 61% by the year 2000"*.

Target No 11 *"Initiate policy development on legal and programmatic aspects of abortion and work toward the legalisation of abortion"* has already been achieved. Abortion in Nepal has been legalised, provided it is carried out at recognised facilities. Target No 12 *"Introduce the enforcement of the legal age of marriage in coordination with the relevant government entities"* is still relevant to the current situation but is often ignored,

particularly in rural areas. We found most of the strategy statements still relevant to the current strategic needs.

The data indicates that the Safe Motherhood Policy (1998) requires an urgent revision. The existing policy has not been effective in directing strategies and guiding effective programs to meet the stated objectives. The key maternal health indicators of antenatal care (Figure 1), delivery attended by skilled birth attendants (Figure 2), institutional delivery (Figure 3), and postnatal care (Figure 4) all suggest a major shift in the policy is essential to bring faster improvements.

**Discussion**

Although improvement is underway, progress has been sluggish for key maternal health indicators, such as the percentage of pregnant women with four antenatal care visits, the percentage of deliveries attended by skilled birth attendants (SBAs), the percentage of institutional deliveries and percentage of three postnatal care visits. Despite *"ensuring the provision of maternity care at the community-level as close to the people's homes as possible"* in reality Nepal has no professional midwives.[25] More recently, efforts have been made to organise academic programs in midwifery. Although some objectives of the policy are still relevant most, such as objectives related to the different level of health institutions, are no longer relevant.

Targets 1 to 10 listed above are outdated or no longer relevant. For example, target No 1 is outdated as the current maternal mortality ratio of Nepal is 239 per 100,000 live births.[2, 26, 27] Similarly, target No 2 is no longer relevant as the current CPR is 43.2%.[28] Likewise, target No 3 is outdated as the current antenatal care coverage is 84%.[29] In addition to these, the number of recommended antenatal visits needs to be updated as per the recommendations of the World Health Organisation (WHO)[30].

The existing Safe Motherhood Policy as a whole should to be revised to accommodate the current policy, program and institutional contexts. The targets for example, can no longer drive the current action programs. Similarly, the strategies must be specific so that they can be achieved and measured against outcomes. For example, strategy No 1, *"Promoting intersectoral collaboration in order to attain the aims of safe motherhood"* needs to specify its strategy. Although there have been some developments in health education, legislation, and the role of women in political and social development, there has not been significant progress. Although Strategy No 2, *"Strengthening and expanding basic maternity care services, including family planning, at all institutional levels"* has not achieved all its objectives, it is still relevant in Nepalese context. Similarly, strategy 2.1: *"Expand promotional and educational activities through community health workers and other workers (e.g., Maternal and Child Health Workers (MCHWs), Female Community Health Volunteers (FCHVs), Traditional Birth Attendants (TBAs), Village Health Workers (VHWs) to disseminate basic motherhood messages and motivate people to utilise available maternity/family planning (FP) services"* suggests that it is essential to expand promotional and educational activities through community health workers and other workers. Community education through culturally appropriate methods is effective in remote rural and limited literacy environment.[31] The strategy document is no longer consistent with the current practice of program intervention. For example, the strategy suggests mobilising TBAs, but the TBA program no longer exists in Nepal. In remote settings, mobilising women's groups could be an effective option for community participation for improved maternal health outcomes.[32] Strategy 2.2: *"Improve, expand and standardise prenatal, delivery and postnatal services at all levels of the health care delivery system"* is still appropriate. However, it should be made more specific to guide further actions. The content of strategy 2.3 *"Train, deploy and support appropriate*

*personnel for each level of maternity services, including emergency obstetric services, to accommodate the level of care required. In particular the skills and capabilities of district hospital staff in essential obstetric functions will be developed"*, has to be updated according to the current levels of health institutions. 2.4: *"Improve and expand the existing referral system for routine maternity/FP care and emergency obstetrics to make it more appropriate, accessible, and effective. In particular, the essential elements of obstetric care are to be made available at the district hospital i.e., surgical obstetrics, anaesthesia, medical treatment, blood, replacement, manual procedures and monitoring of labour, management of women at high risk, family planning support, and neonatal special care"* and 2.5: *"Establish a focal point for planning, monitoring and evaluation for safe motherhood activities/services at all levels of the health care delivery system"* are still relevant. This strategy was established with a view to plan and evaluate programs based on the facts and the evidence to ensure rational distribution of the services. However, there is an inequitable distribution of services between rural and urban areas. Therefore, the strategy document should be updated to guide equitable program actions and match the current structure of health institutions.

Strategy No 3: "Raising the status of women so that maternal morbidity and mortality will be reduced" is still relevant to the existing situation. Strategy 3.1: "Promote universal access to free school education and completion of primary education for all girl children, and expand literacy program, particularly for female adolescents and adult women" is an essential component of the strategy. Although school education for all is free, there is a need to educate communities to enrol girls in school and help them complete their education. The mere provision of education may not necessarily encourage local people to use the services. Similarly, Strategy 3.2: "Intensify the development and use of information, education and communication materials for safe motherhood through

multisectoral agencies, using a multimedia approach, in order to create awareness and motivate the general public, policy makers, community leaders and health workers to achieve individual, family and community behavioural changes in support of safe motherhood" is an important strategy, and needs to be directed to people in rural communities to empower them to address delays: firstly, in coming to a decision; and secondly, in reaching a health facility for care. It is critically important to strengthen health facilities to address a third delay, the delay in accessing care at the health facility. The provision of essential health care services, particularly maternal health services in the rural population, is long overdue. Community education and engagement is essential for sustained behaviour change.[32] Strategy 3.3: "Ensure the provision of adequate and appropriate health services for girls and women of all ages" is critical for improved health outcomes. There is an urgent need to develop the logistics system to match the strategies established. Strategy 3.4: "Promote the development of income generating activities for women, including employment in the formal sector" would have resulted in multifaceted positive outcomes in the lives of women if it was implemented. The employment opportunities for women have been improved on the basis of reservations for women. However, it is not sufficient to address women's employment needs. Promoting and developing income generating activities for women has not been satisfactory. Similarly, Strategy 3.5: "Ensure the establishment and enforcement of laws affecting safe motherhood, in particular, raising the age of marriage to 18 years for females, and nation-wide availability of abortion services" is still relevant. Although the age at marriage has been raised by law, early marriage is still common, particularly in the remote rural settings, and there is a familial expectation to have children immediately after marriage.[33] This risks early pregnancy complications. Strategy No 4: "Promoting research on Safe Motherhood: Initiate and promote policy and programmatic research activities at improving maternal health services and ultimately the health of women" is an important

strategy but there has been insufficient research organised in the field of safe motherhood to establish evidence for policy change. In addition to the inadequate program outcomes, this policy needs to be updated so that it is based on the current political context. For example, Nepal is no longer a monarchical state but a republic.[34]

**Recommendations**

It is time to review the Safe Motherhood Policy (1998). The revised policy should aim to:

1. improve the maternal mortality ratio by reviewing the program implementation plan.
2. plan a road map to improve maternal outcomes based on the available evidence
3. improve the functional referral system, with a particular focus at the local level
4. educate to empower communities and strengthen health facilities to address three delays
5. improve the health workforce
6. improve health infrastructure
7. improve the logistics management system
8. improve the health management information system
9. improve coordination and communication amongst the key stakeholders for optimal outcomes
10. develop intra- and inter-sectoral coordination for improved maternal health and outcomes
11. improve resource allocation for safe motherhood programs
12. design and develop the policy to match the current Federal, Provincial and Local structure on the basis of functional analysis approved by the Council of Ministers
13. set new targets on the basis of the Constitution, Sustainable Development Goals (SDGs) and Nepal Health Sector Strategy III (NHSS)

## Conclusion

This review has identified many areas in the existing Safe Motherhood Policy (1998) which require revision. The review will assist the government of Nepal, through the Ministry of Health and Population, to assess the national and international environment and to develop a more effective policy for safe motherhood programs, so leading to improved maternal health outcomes in Nepal.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## Conflict of interest

The authors report no conflict of interest.

## Authors contribution

All authors discussed and developed the review plan, agreed on the data, interpretation and contributed in drafting the manuscript or reviewing it critically for intellectual content.

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# Chapter Eight
# Discussion

## 8.1 Introduction

This thesis has presented the results of a successful maternal and infant health promotion intervention conducted in rural Nepal using song. In this chapter, the results will be placed in a cultural, geographical context in light of current knowledge. The following has been discussed: the maternal health situation in Nepal, particularly in the research villages. Also, health-seeking practices during pregnancy, their influence on maternal survival and the causes of maternal mortality in rural Nepal as well as the methods used to educate community and the role of family and community during pregnancy and childbirth has been deliberated. Similarly, the scientific justification of the key health messages used to educate community has been discussed. The involvement of male, in maternal care issues, an essential component in resource poor environment has been discussed. Furthermore, the effectiveness of using credible sources to educate the communities and community embedding in design, development and implementation of the program has also been discussed. This chapter discusses the results of the systematic literature review including the issues of behaviour change to improve maternal outcomes.

The intervention using singing and dancing health messages for community education was associated with a doubling of the knowledge score regarding pregnancy care from 11.60 to 22.33 out of a possible 36 marks. This increase was statistically significant and much greater than the mean 0.81 increase observed in the control group. The community education programs therefore resulted in a significant improvement in the knowledge in the intervention population regarding antenatal, intrapartum, and postnatal care.

## 8.2 Singing health messages: A novel approach to the community

Using songs to disseminate messages regarding pregnancy and childbirth in the community was a novel approach in the Nepalese rural setting. The program successfully brought the community together in a coordinated effort to organize both the song competition and the musical procession effectively. The intervention involved activities such as rapport building, facilitating the community to take the leading role and engaging the whole community in the process. Our intervention was designed to improve knowledge about pregnancy and birthing care among all involved in the intervention, and in particular, the decision-making members of the intervention villages. Male engagement, in particular, is important because of men's involvement in managing and controlling issues such as seeking skilled care, finance, and transportation [262].

The results showing improved knowledge of the importance of antenatal care, supplementary diet, and rest during pregnancy suggest not only that the education methods were suitable but also that the content of the messages met community needs. Similarly, the knowledge of the importance of childbirth planning also improved. This is an important finding and is coherent with the theoretical base proposed in chapter 2. For example, the Health Belief Model (Figure 2.4) suggests that knowledge and practice are modifiable provided the communications to change behaviour are based on its six concepts (Figure 2.4), particularly 'community perceived susceptibility' and 'perceived benefit' [258]. The consideration of these two concepts, in particular, was intrinsic to the success of the singing intervention.

However, the Health Belief Model [258] may be criticised for taking an individualistic approach. In the context of the research area, improved pregnancy behaviour is practiced in a social environment. Therefore, an individual approach to behaviour change

communication may not be as effective compared to approaches aimed to improve community practice. A person's health also depends on the family, social cultural groups and the community they are associated with. Therefore, health programmers and health care providers may have greater success in promoting healthy behaviour if they can be sensitive to the sociocultural contexts of the targeted population [251]. The current study has shown that interventions to modify behaviour can be tailored to community dynamics, their means of interpersonal interaction and social emotions. The more the interventions are designed and constructed with consideration given to these often-overlooked factors, the greater the likelihood of success in long-term behavioural change[264]. Furthermore, in order to ensure tangible improvements in maternal outcomes, the planning and design of programs need to be suited to the local context. Priority must be given to the modification of medical and social dynamics encouraging freedom in health care seeking, participation in decision making processes and providing education to female children. These interventions can substantially contribute to an improvement in maternal health and wellbeing [93].

Although the concepts of the Health Belief Model were considered, in this intervention, education was orientated to the community rather than at the individual level and was enacted neither on the basis of fear nor by imposing a punishment. The literature base was an important background in developing an intervention plan that was culturally transformative and welcomed by everyone in the community. Community participation contributed to the results. Interestingly, the messages included in the songs were better understood by the local people than those mentioned in the wall chart. For example, delivery care is an area which was not included in the songs that were used in the community intervention but was included in the wall chart. The total knowledge score in the intervention group nearly doubled from 11.60 to 22.33/36 a 92.50% increase. A smaller change in knowledge occurred for concepts related to delivery care that were

covered in the wall charts but not covered in the songs from 2.95 to 5.09/12; this change was still statistically significant ($p<0.001$).

These results echo previous conclusions that interventions aimed to modify the behaviour of the community are likely to be more successful than those aimed at individual behaviour [259]. An important lesson from this intervention is that a community, its concerns and dynamics will have to be well understood before intervention projects to improve the knowledge of the community on specific issues.

The intervention aimed at raising the level of knowledge regarding the importance of antenatal checks, supplementary diet, rest during pregnancy, planning for childbirth, and the use of skilled birth attendants. Since all members of remote, rural Nepalese communities contribute to maternal mortality outcomes, this trial was designed to include all community members in the program, to help increase awareness of the problems and the potential solutions. Because of the central role of community singing and dancing in Nepalese rural life, it was hypothesized that the community knowledge of antenatal care, and the value of skilled birth attendants could be improved through the use of a program of writing song lyrics, and singing those health messages to traditional music, combined with a wall chart illustrating key points. This hypothesis was supported.

The key health messages were established by expert opinion supported by the literature. Antenatal visits are thought to be critical in predicting the likelihood of complications enabling preventative action [92, 272]. We therefore took up antenatal care as one of the important message areas to be included in the community education program. At least four antenatal visits at the fourth, sixth, eighth and ninth month of pregnancy are

recommended by World Health Organisation and currently practiced by the Nepalese Government [273].

The nutritional state of Nepalese women in rural settings is known to be compromised, and severe anaemia and other malnutrition-related complications are common [274]. A wide variety of foods (rice, vegetables, meat and maize) during pregnancy are known to positively influence the size and health of the baby, [275] while women who have an inadequate diet during pregnancy experience a higher rate of poor pregnancy outcomes [262]. Working long hours and lifting heavy weights during pregnancy is associated with preterm birth and retarded foetal growth [263]. Disturbed sleep and lack of adequate rest is also known to be associated with poor pregnancy outcomes [264]. Finally, skilled care at birth is associated with significant reductions in the risk of complications and death of the mother and baby [214, 265].

It was a feature of our intervention that local people were given multiple opportunities to discuss the key messages (antenatal examinations, supplementary diet and rest during pregnancy and planning for childbirth) to be included in the songs. For example, they heard of the key message areas during orientation sessions, worked in the group to develop the songs, developed the singing and dancing before presentation at the community festival and finally presented them in the competition organised within the community. Furthermore, the people had the opportunity to listen to the winning songs' health messages and to watch dancing in a house-to-house environment. The observed improvement is consistent with previous evidence that to bring about desired changes in health seeking behaviour in the rural context, messages transmitted through singing can be an effective strategy [185]. Education through entertainment is an important method of communication. Using entertainment programs to promote pro-social messages maximises audience exposure, linking and recall of messages in ways that might not be

achievable through the use of straightforward didactic messages [276]. This finding is important as it shows the potential of using singing as an effective method to educate people, not only in rural Nepal but also in other communities where singing is an accepted and cultural practice in the community. However, education through singing may not be suitable for all rural settings where singing may not be so well established as a cultural practice as it is in the intervention research villages.

## 8.3 Demographic data

The demographic data analysis demonstrated that the effect of age within males and females in terms of improving knowledge was generally similar. This evidence supports the conclusion that the pace of learning at older age diminishes [277]. There is conflicting evidence regarding age and learning ability. For example, one of the studies [41] concluded that although older people may seem to be less able to learn compared to younger people, the circumstances in which they learn is more significant than the capacity to learn [278]. In the current study, we observed that people from different age groups learnt almost equally regardless of their education and economic status.

### 8.3.1 Gender

Both males and females, regardless of their marital status, improved their knowledge in the post-intervention survey compared to the baseline data. A 12-month follow-up survey suggested that both males and females retained their knowledge since the intervention. There is a large variation between unmarried males (1.18) and married males (5.08) in the acquisition of knowledge. This result echoes the theoretical concept of Health Belief Model (HBM) that those who have a perceived risk of health problems, for example in this case married males, are more likely to face issues related to pregnancy and childbirth

than those unmarried males and are therefore more likely to be motivated to gain knowledge.

### 8.3.2 Age

The acquisition of knowledge among the intervention participants was significantly improved compared to control group. This indicates the effectiveness of the education methods used in the intervention. The intervention worked equally in both males and females and among all age cohorts, regardless of age. This rejects the concept that suggests older people are less able to learn compared to the younger ones [41]. The enabling environment provided to learn is more important than the age factor [278].

### 8.3.3 Age at first child

Most respondents indicated that they had parented children between the ages of 20-29 with the next largest category being at 15-19 years old. In the intervention district, males who first parented at an older age scored higher at post-intervention compared to their female counterparts. The data indicated that after the intervention, women that had a child from the ages of 15-19 and 20-29, and those that did not have children all scored significantly higher compared to the control group. Equally, males that had children from 20-29 and 30-34 scored significantly higher than their control counterparts. This result characterises the differences between males and females in Nepalese rural age at first chid practice. Male participants in the research area experienced having their first child in an older age compared to the female counterparts. This situation indicates that male members are more likely to have their first child when they are relatively matured, educated, economically active and able to face and manage parenthood than their female partners. Early marriage and family expectations of childbirth immediately after marriage could lead to a fatal consequence. This situation could further disadvantage women in education

and health seeking and economic behaviour. An informed family environment could prevent early marriage and childbirth essential to prevent poor maternal outcomes.

### 8.3.4 Group-wise comparison

#### 8.3.4.1 Education and gender

The group-wise comparisons between intervention and control shows that in nearly all cases, there was a significant difference between the control and intervention scores. Although the rurality, sociocultural and socioeconomic conditions of the intervention and control population was similar, the baseline score in intervention cohort was observed to be significantly lower compared to control. The only additional variables in the control cluster were access to a college and a private hospital. The control population's access to a college and a hospital may have contributed to its higher baseline knowledge. This difference also supports previous conclusions that our level of knowledge, behaviour and relationships are systematised by the influence of the science and technology we experience [279].

The intervention was associated with a significant increase of knowledge in the intervention group for concepts included in both the songs and wall charts. The knowledge of antenatal care, supplementary diet and rest during pregnancy, and planning for childbirth improved. The greatest improvement in the knowledge was observed among the illiterate cohort and the low-income cohort. For example, a significant improvement was detected among females with no education compared to females with higher education. A similar improved treatment pattern was observed in knowledge among males with no education compared to males with higher education.

This result indicates that the methods of community education used may have been suitable to those participants with a limited literacy level. This finding supports the

conclusions of previous studies. For example, there are basically two types of literacy a) general literacy and b) health literacy. *Health literacy is; "the constellation of skills, including the ability to perform basic reading and numerical tasks required to function in the health care environment"* including *"the ability to read and comprehend prescriptions bottles, appointment slips, and other essential health-related materials"* [280, 281]. This concept is arguable. If health literacy is all about the ability of an individual to function in a given health care environment, the characteristics of the individual, the health care system and the social and economic circumstances should all be taken in to consideration. Pregnancy-related health care seeking in the rural villages of Nepal, for example, is not only a matter of the knowledge of an individual woman, it also largely depends on numerous non-health variables. Moreover, health literacy is relative and depends not only on sociocultural, economic and system-related variables but also on individual situations. For example, individual abilities may not be stable over time or in different circumstances. A person's abilities to cope and comprehend health-related information and seek care may improve with the help of health promotion programs and decline due to age and health conditions that affect cognitive ability [282]. Furthermore, human health is more than an individual matter and it needs to be viewed and addressed in a social context that aims to improve the practices of the society as a whole [283]. The intervention was planned and executed on the basis of these concepts. The surveys resulted in the improvement of the knowledge related to care during pregnancy and childbirth.

#### 8.3.4.2 Economic status and gender

Low-income females scored higher at post-intervention compared to high-income females. A similar trend was observed among males; low-income males scored higher compared to high-income males. There was a negligible change observed in the control

population. At the 12-month follow-up survey, there was no loss of knowledge. Interestingly, both high income males and females scored more than their post-intervention survey scores. This finding supports the conclusion that economic factors are one of the major determinants of attaining knowledge [284]. It further suggests that women residing in the rural villages of Nepal may not have sufficient knowledge to seek health care because they are economically deprived. For policy makers this is an important aspect to consider when planning the delivery of community health services, particularly maternal health care services, in different population subgroups of different economic environments.

### 8.4 Singing: A cultural method of education

Singing was a particularly important method of education given the cultural background of the research area. A large number of participants indicated that the messages given through the songs were very helpful. Participants who found the songs helpful were more likely to put the knowledge they gained into practice. For example, some of the participants provided additional food, rest and planned for a childbirth during pregnancy in the family or neighbourhood. Most participants said that they provided information to their neighbours and friends. These observations indicate that the messages provided were both understandable and useful in the local context and that the community was concerned about issues such as pregnancy complications, morbidity and maternal death. The subject chosen (maternal mortality) and the method used (singing) were both effective in encouraging villagers to practice their new knowledge. The results support the findings of previous studies that to educate people or the community, the creation of a 'teachable moment' is essential [181]. The intervention utilised not only a teachable moment in the community but also created a teachable environment within the community. It was also found that 41.3% of the participants were still singing the songs (Appendix 17) from the program 12 months later. This indicates

the likelihood of continuity in spreading the messages imparted in the community. In previous research, it has been indicated that the greater the respect given to local culture when community-based interventions are designed and implemented, the greater the likelihood of success in long-term behavioural change [264]. In the intervention organised in the rural villages, all the key factors were considered carefully to ensure the community succeeded in gaining the knowledge that could influence them to improve their behaviour. Given the high wholehearted acceptance of the community for the singing intervention and the cultural approachability to the different community subgroups, it is important for government, health planners and strategists to consider the local culture and practices for improved outcomes.

## 8.5 The Holy Duty wall chart

The wall chart distributed with key messages was found to be helpful by a large number of participants. Those that found the wall chart helpful were more likely to indicate they provided rest during pregnancy, planned for childbirth and provided information to neighbours and friends. There may have been various reasons why people found it helpful. For example, the messages reflected community concerns, and the design of the wall chart may also have encouraged the community to learn the messages. The wall chart was pictorial and self-explanatory and therefore suitable for an illiterate environment. The incorporation of the local deities on the wall chart may have further facilitated the community to own and internalize the messages. Remarkably 89.6% of the participants still had the wall chart displayed 12 months after the intervention. Most participants (96%) that found the wall chart very helpful, kept the wall chart because of its good messages. This result further supports the argument that the messages provided concerned the community and the community were happy to have such an effective program. This successful experience indicates that community education programs ought to be designed in ways that are suitable to the local culture and literacy environment.

Therefore, it could be useful for the Nepalese government to design and develop community health education programs specific to its target audiences.

### 8.6 Community engagement: A key to success

Health care interventions are often limited to a rigid and structured operational framework rather than being designed to meet the socio-cultural and economic realities of the communities they serve [172]. National programs and strategies often fail to consider the hardship imposed by distance and lack of infrastructure that is peculiar to people living in rural settings [173]. Poor social status among women in South Asian countries is a great contributor to lack of family planning, and a rising population. This "feminisation of poverty" in the region is a fundamental factor that has impaired societal development [80]. Engaging local people to educate and mobilise the community has the capacity to provide multidimensional benefits [211] such as helping to modify practices [208], encouraging a sense of community [209], and facilitating the identification of local methods to address problems [210].

We engaged the communities from the inception of the research project and ensured their meaningful leadership in the intervention. We have demonstrated that if community education programs are designed, developed and executed properly by addressing community needs and respecting local culture and talents, then long-term positive changes in the knowledge, attitude and practices both at the community and government levels can be realised.

We could not find any prior evidence regarding the impact of songs to educate communities in low-income environments. Previous studies using cultural media demonstrated positive results; for example, in Papua New Guinea, a trained theatre group

was used to educate the school community on local health problems and a high level of engagement was demonstrated [274]. Similarly, in Bangladesh a village theatre used to educate the community about eclampsia was effective in maintaining the interest of the audience and improving knowledge [275].

Although we could not find evidence that songs have previously been used to educate a whole community on safer pregnancy and childbirth outcomes, in Moyamba, Sierra Leone, songs created by students and performed as drama were found to be associated with a reduction in teenage pregnancy [265]. A basic premise of our study design was that in rural settings, folk media plays a central role in passing on family and community culture and, as such, social gatherings, feasts and most festivals include a singing and dancing component. The findings of our study echo evidence from India and Pakistan in which hard-to-reach families were accessed for polio eradication programs through folk media interventions [208, 214]. Our study supports the use of folk media, especially in illiterate and financially deprived communities [285]. Social networks strongly re-enforce cultural behaviours. In this study, we were able to expose almost all members of the community to new ideas on the management of pregnancy at the same time; this may have generated a new attitude within the whole community leading to the preservation of the new knowledge over a 12-month period by a strong social network [286]. Researchers have documented that community networks and supportive interactions are effective in enhancing health and wellbeing [257]. The whole program for this study in rural Nepal was discussed, developed and implemented with all sections of the community under the leadership of the local people. As singing plays an important role in the rural villages of Nepal, key maternal health messages regarding safer pregnancies and childbirth were promoted through song. Local teachers, students and traditional singers disseminated these health-themed songs throughout the community [287]. The strength of community

ownership of the program was important. The community established a high level of knowledge through their own efforts, knowledge that may save lives in the future.

## 8.7 Villagers' comments on the song competition and singing intervention

The overwhelming community participation in the intervention and singing sessions over individual days were recorded (Appendix 15, list of YouTube videos of the events and community participation). The local people were very happy not only with the information provided but also by the engagement of every section of their community in the programs. See below for some of the comments made by the community representatives about the effectiveness of the interventions, see the video: https://youtu.be/KnzbvRKxmhE. The comments of the community representatives are as follows:

### 8.7.1 Comments: Member of mother's group

Mothers' groups are informal groups formed to discuss women's issues and participate meaningfully in community-based events. Typically, they are engaged in health promotion programs and work as counsellors and advocate groups for social change, particularly women's health issues. They are the informal health contacts at the grass root level representing a few households of their neighbourhood. Members are provided with basic health training to educate local people. The role of mothers' groups has become increasingly vital as they as they work between health institutions and the community. They are a powerful workforce stimulating the community to improve health practices and they could play an important role in improving maternal outcomes [288].

The lady who commented on the research intervention was saddened that women in the villages have to risk their lives during pregnancy and childbirth, and that some face fatal

consequences. Provision of skilled care could save the lives of mothers giving birth. She sincerely asked for services that would help save mothers in her community. She said *"We have been greatly benefitted by this program you have brought to our homes. We women are still facing a lot of hardships. We feel an urgent need for a hospital at a nearby place. To follow these messages, we need a hospital because our expecting mothers cannot travel long distances during labour and childbirth. I request that you please allocate provisions for such health centre for our pregnant women."* She further added: *"Due to our cultural mindset, our men can't empathise with the hardships faced by the women. This program has greatly helped us to express our grievances and narrow that gender gap. We are very grateful to you and Binod sir for organizing such a benevolent program. For our basic survival we still need a hospital because our women may lose their lives if we can't transport them quickly to the health centres when they are in labour. I solemnly request this to you on behalf of all us women."* She was emotional while making these comments. She spoke about the local culture, male mindset, distance women have to travel during labour and the society that simply accepts maternal deaths occurring every now and then in her community. These comments clearly demonstrate the appropriateness of the issues raised by the intervention. In particular, women found the intervention overwhelming as it pressured all the important male members of the community to become involved in the program. The women thought that the intervention voiced their supressed issues loudly to the whole community, giving voice to the discrimination they have been suffering for generations.

### 8.7.2 Comments: Head teacher

The teacher who commented participated in the song competition organised as part of the intervention in the community. In a speech at the end of the song competition he said, *"We are thrilled to witness that a single program has been able to mobilise the whole community to educate the community on safer pregnancy and childbirth"*. He further said that the program

had been even more effective than anything INGOs could do, with their many millions of dollars. Despite the limited resources, he could see a huge change. He appealed to the audience *"I request you all to please translate these health message songs into your daily practices. Rather than only for competition and entertainment, let's make it a point to apply these messages in our day to day practices. Also, let's encourage and welcome the teams of singers that will be coming to our homes with these messages"*. He assured villagers that, *"each household of our villages will be benefitted by the singing program as we have limited knowledge about healthy antenatal practices. Even I, myself, have learned important messages through different songs and their lyrics about measures to ensure safe pregnancy through antenatal check-ups. It is still a grotesque reality that brings us close to tears when we see pregnant women suffer during pregnancy and childbirth"*. He further added that, *"It is heart-wrenching that we have to see women lose their lives on the way to health centres when they cannot cope with their difficulties in pregnancy. This program is an important step towards ending such misery and saving lives. Let's facilitate the important health messages through this program to reach every nook and cranny of our community and translate the messages into our daily practices. I want to thank Binod Bindu Sharma who has truly been a trailblazer. I am sure this will help save mothers in our communities."*

The comments made by the teacher represents the community's past experiences. In an informal conversation, he said that locals have come across quite a few interventions, such as programs aimed at improving community forestry, family planning, agriculture and local tourism. However, none of the programs were as successful as this intervention. He said the community involvement and mobilisation was one of the reasons for the successful intervention and the approaches applied during the intervention were suited to the local culture, and directly addressed community needs and aspirations.

### 8.7.3 Comments: Intervention team leader (local teacher)

The intervention team leader commented that *"the program was a huge success in communicating to the community such an important issue, safer pregnancy and childbirth"*. He said, *"We are overwhelmed seeing how the program is wholeheartedly welcomed by the local people and they have no reservations in participating in the program"*. He further added, *"We hope the program will be expanded to a larger community in the future. These programs should continue towards illuminating these essential issues for families, communities, regions and the country as a whole. This program has been successfully communicated through Facebook, Twitter and other social networks. This program has provided essential information about pregnancy and the developmental growth of the foetus that takes place way before the actual delivery, which is a commendable feat. We are keen to expanding and making the program even more effective in the future. We are very pleased that we could be part of this program. This program educated villagers on the importance of antenatal visits and ensuring safer childbirth experience. We will however, not be fully complacent until each household is able to translate these messages into practice."* It is an important lesson from the intervention that to educate resource-poor communities about health-related issues, particularly taboo issues, involving the key community leaders from the beginning (in planning, designing, developing and organising the intervention) is essential.

### 8.7.4 Comments: Member of female community health volunteers

The lady who commented on the intervention is responsible for educating the community, especially on maternal health issues. She is also responsible for organising programs in the community in coordination with different groups of local people and members of the women's group. She said, *"I am very happy that the song competition was a successful program and hopeful that it will result in a greater improvement in the knowledge essential to safer pregnancy and childbirth"*. She added, *"Chitre and Ramja villages are very fortunate to have*

*such an important program. The 26 songs we developed and presented in competition contain the complete information for safer pregnancy practices. We are very happy and hopeful that this program will help improve knowledge of pregnancy and childbirth practices. It will be further effective once the messages are taken to the individual households. It will certainly bring a positive change in women's lives in these villages"*. She also said, *"We announce that this program will help people to ensure safer deliveries. We will facilitate the community to organise deliveries at the birthing centres. We are truly grateful towards Binod sir because it has created an environment for change. We thank him again for making such an important effort in transforming the communities for a complete change in pregnancy and childbirth practices"*.

### 8.7.5 Comments: Village Leader, Chitre village

This commentator was one of the senior leaders in the village. He was among the key members involved since the beginning of the program and helped organise and manage the singing competition. Being a member of the School Management Committee of Shree Jana Siddha High School, Chitre, he was involved in the selection of the team of teachers for the intervention within Chitre village.

He expressed his happiness *"for having organised such an important program providing valuable information to save our daughters-in-law"*. He felt the *"program had helped everybody in the community to understand the messages given through the singing and dancing*". He further added, *"This program has raised awareness on safeguarding and promoting the health of our pregnant women. We have received valuable information from this program. We feel very encouraged by this program. This program has influenced parents, children, everyone in our community. We had very primitive notions about the antenatal*

*check-ups. We have come to be informed about a great many things from the program. Therefore, we feel very grateful and happy".*

In the sociocultural setting of rural Nepalese villages, the provision of reciprocal support among people, families and groups is an everyday occurrence. These exchanges and interactions take place both in formal and informal networks. For example, social groups, family, friends and co-workers provide support in an informal setting, and public service workers and other professionals provide support in a formal setting. In such networks, people are likely to share the information within their network and provide a variety of supports [252].

In rural settings, the effectiveness of information and support depends on the source of information, meaning the "who" factor becomes important [253]. For example, the information and support provided by credible sources such as teachers, village officials and opinion leaders, particularly family members, is important for long-term behaviour change [252]. It is evident, however, that the information and support provided by friends and neighbours are likely to be short-term. In a health care environment, clients usually require emotional care from family members, neighbours, friends and, most importantly, information support from health care professionals [254]. The most effective support is likely to come from those who have experienced the same problems [255]. This was observed in the intervention area. For example, the main theme of the intervention "Safer Pregnancy and Childbirth" was associated with the maternal deaths the community had witnessed for generations. The pain of maternal losses was shared by everyone in the community and it was therefore a community concern. Having taken on the issues of community concern, people of all subgroups, particularly males with important roles in the community, were prepared to take a leadership role in the intervention organised within the communities.

## 8.8 Involvement of people of all ages in the intervention

There was enormous community mobilisation in the intervention. The efforts made to establish community rapport and contacts prior to the intervention have contributed to the level of community engagement achieved. The careful approaches to improve informed community engagement in the intervention, particularly through social networks, certainly contributed to a great extent. The social networks of different subgroups of the people such as students, teachers, mothers' group members, health workers, volunteers, traditional leaders, singers and healers played an important role individually and through social networks.

Additionally, the inter-network interactions further enhanced communication and support mechanism within the community. The decisions regarding Judges, criteria for the evaluation of the songs, the date and venue for the program were made by the local people. The community discussed and set the criteria to evaluate the songs as follows:

a) The songs should include all key message components (antenatal care, supplementary diet and rest during pregnancy and childbirth planning), b) in each song, there should be a minimum of ten specific song lines, c) all the songs should be written and sung to locally popular melodies, d) the singing group should have five to seven members and e) the songs should not be longer than ten minutes.

Teachers, students (senior and junior), village officials, Mothers' Group members, senior women, Youth Club (male and female club) members, traditional healers, opinion and political Leaders, town criers, traditional singers and Female Community Health Volunteers were engaged in different roles during the project. A key finding is that there was a remarkable difference in the level of involvement of males before and after the intervention (Figure 8.1).


Figure 8.1 Involvement of males in the intervention before and after

The 12-months follow-up data indicated that the mean score was 0.27 (95% CI: -0.10, 0.64, P=0.154) marks higher than the score of the post-intervention group, that is, there was no loss of knowledge over the 12-month period. As the local people realised how important the messages were to save mothers during pregnancy and childbirth, they were motivated and passionate to take part and share the information with their relatives and neighbours.

## 8.9 What did the villagers want?

As mentioned in the comments by the Head Teacher of Ramja Thanti school, the community experienced a complete transformation as a result of the approaches of the intervention. For example, they witnessed the exceptional level of community orientation and participation making the intervention, in one opinion, "worth more than a million dollars". They were happy with our approaches to community involvement in series of activities, particularly the method of community education (singing) that helped their community to develop the health songs and implement them to educate the people within the community. Furthermore, the community was pleased with the leadership role it played throughout the intervention.

### 8.9.1 The community wanted to participate in the interventions that included songs to educate the community in the future

Although the community education programs were planned to be implemented in only the two VDCs in the intervention cluster, people in the adjoining villages expected us to bring the intervention to their village also. When we announced that the community intervention was concluded, and on hearing of the benefits of the intervention, some people were not happy that we were not going to their villages. They complained that we should have taken the program to their areas. When we explained that we were a research project they then asked if we could give them the Holy Duty wall charts. As a result, we provided the remaining wall charts to those who came to us in person. The local community, particularly the women, were surprised to see important people (the teachers) being mobilised in a house to house environment to sing health songs related to pregnancy and childbirth. They were especially pleased that Mr. Ganesh Prasad Timilsina, Chairman of the National Assembly, accepted an invitation to observe the intervention in the village. He took part in the singing and dancing intervention in the local village (Figure 8.2) and has since been a powerful advocate of the program at government level.

The data analysis showed that the methods of community education through singing health messages was liked by the locals. A significant number (94.3%) of female respondents would "very much" like the singing program to be used in other areas of health promotion compared to "somewhat" (3.9%) and "no" (1.7%) respectively. Similarly, 93.1% of male respondents would "very

Figure 8.2 Chairman of the National Assembly Mr. Ganesh Prasad Timilsina dancing in the intervention organised in Ramja Deurali

much" like the singing program to be used in other areas of health promotion compared to "somewhat" (5.2%); 1.7% of male respondents said "no".

This is clear evidence that the locals want to participate in such interventions in the future. The strength of this study was that it demonstrated an improvement in knowledge regardless of education, economic or marital status. The whole community engaged in and led the intervention. Those participants with lower academic levels had even greater gains from the intervention. Actually, it empowered local people to speak about their situation and needs. Women in particular were able to freely express what their problems were and how they felt those problems could be addressed. For example, a number of local women came to us explaining the sociocultural, economic and geography-related barriers to seeking care and demanded help to improve the situation (see the video: https://youtu.be/KnzbvRKxmhE). This was an important empowerment observed in the community. Given these positive changes, we can anticipate that people may practice the knowledge they gained from the intervention. Making efforts to improve behaviour in the communities where culture is orally based and plays an important role in behaviour change issues, needs conscious efforts to address the intellectual mindset of the locals who are predominantly speakers and listeners rather than writers and readers [289]. A significant number (92.9%) of females and 92% of males expressed that they would be very willing to participate in a singing intervention in the future. The whole community was overwhelmingly supportive of an intervention like this, particularly one focusing on women's health issue. The locals above are a few of many who expressed their happiness about the intervention.

### 8.10 Evidence based learning (systematic review of literature)

Before developing an intervention research program, it was important to understand the

issues and challenges in organising community-based interventions that are effective in limited resource environments. Recognising this need, we carried out a literature review titled "Systematic review of community participation interventions to improve maternal health outcomes in rural South Asia". The aims of the review were to compare the overall effects on important maternal health outcomes of different approaches to community participation in maternal health care education compared with health service or control/standard care interventions. Furthermore, the review aimed to examine which interventions promote husband, family and community awareness and involvement in maternal health care and result in better maternal health care-seeking and the utilisation of maternal health services to achieve improved maternal health outcomes in rural South Asian countries: Bangladesh, India, Nepal, and Pakistan.

This review provided valuable knowledge and practical experience both to develop an effective community intervention and determine the factors necessary to improve maternal outcomes. It is evident that care throughout pregnancy and childbirth is associated with good maternal and infant outcomes [51].

It has previously been suggested that the husband's involvement in maternal care use should be prioritized, perhaps above interventions aiming to improve women's education and their status in the family [155]. Education and involvement of the husband is important particularly in low socioeconomic and uneducated community environments [290]. Considering the socioeconomic, cultural and literacy environment, we designed a program that was led particularly by males, who are the important decision makers related to health seeking and finance. Intervention strategies adopted in Bolivia involving men and community leaders resulted in improved maternal health outcomes in a low resource environment [291]. A study carried out in Maharashtra, India concluded that the maternal

death rate was three times higher among women with uneducated husbands compared to the group of women with college-educated husbands [292]. The involvement of husbands in the utilization of maternal care, particularly in safe motherhood issues, needs to be included as an equally important factor along with the improvement of women's education and their status in the family [155]. The involvement of fathers-in-law and husbands is also essential in rural settings [109].

Previous research has concluded that women from deprived communities with poor access to health care and low levels of education have an increased risk of mortality [24]. Meta-analysis showed that out of all the community participation intervention groups, community mobilisation and women's groups were most effective in improving the odds of antenatal visits. The selection of suitable interventions is critical. This could be one of the reasons that although maternal mortality ratio seems to be improving worldwide, the mortality of women in rural areas has not changed significantly [23]. Community participation interventions to improve maternal health outcomes in the rural context are essential. A study carried out in Tamil Nadu, India showed a significant improvement in knowledge of maternal and child health issues following text messaging through mobile phones. Of the participants, 98.33% expressed the opinion that text messaging was an effective means of health education [293]. Although this study was carried out in a rural setting, the high level of literacy in Tamil Nadu may have influenced the result. This evidence may therefore not apply to all rural environments in South Asian countries, as use of a mobile phone demands many prerequisites such as the ability to read and write, the finances to buy a mobile phone, and accessibility of mobile networks in remote locations. We identified that mobilisation of women's groups is suitable for improving maternal health outcomes in a limited economic and literacy environment.

A systematic review of randomised controlled trials carried out in India, Bangladesh, Nepal and Malawi, suggested that women's groups practicing participatory learning and action were effective in halving maternal mortality [294]. In another systematic review assessing the impact of community interventions on maternal health in resource poor economies, it was revealed that community-based programs integrated with multiple interventions greatly improved maternal health outcomes [156]. Similarly, in a systematic review assessing the effectiveness of community interventions in reducing maternal death, it was concluded that community-based antenatal care programs may improve maternal health outcomes [295]. A review of two randomised controlled trials aimed at improving antenatal care practice demonstrated significantly positive results in the reduction of maternal mortality [296]. The effectiveness of these community-level interventions on maternal outcomes challenges the viewpoint that these programs are not worth the cost, as does the current project.

In a social situation such as that in rural Nepal, unless the issues of pregnancy are discussed and planned with the decision-making male members of the household, it is less likely that pregnant women will obtain the necessary antenatal checks required and skilled care during childbirth [119]. Antenatal care is essential to help prevent pregnancy complications and minimize maternal mortality. One of the studies in Nepal that demonstrated significant improvement in birth outcomes in rural communities employed a female facilitator to organise monthly meetings with women's groups [297]. In a study carried out in Pakistan it was shown that mobilising Community Health (Lady Health) Workers was effective in lowering the mortality rate to 39.1 stillbirths per 1000 total birth compared to 48.7 in rural settings [298]. This finding is further supported by another study organised in Bangladesh in a similar environment where community health workers were able to improve maternal knowledge and reduce the risk of maternal death in the

intervention cluster compared to the control cluster: (1.02, 95% CI 0.80-1.30) before intervention and (0.87, 95% CI 0.68 – 1.12) after the intervention [299]. Results were even more promising in Nepal in improving maternal mortality by 30% when the community participated in the interventions [297]. All this evidence contributed to the creation of a theoretical base to engage people of all sections of the community in the intervention. We learnt that most community participation interventions improved antenatal care attendance among South Asian women. The specific knowledge gained from the literature review was important to design research interventions that were suitable to local culture and education needs.

The methods used in the intervention research were designed to be culturally appropriate to local practices. The engagement of local people at all stages of local discussion and implementation further ensured that the methods were culturally sensitive. The community involvement in the organisation and implementation of the project facilitated and empowered the community to act together for the common interest. As the aim was to improve maternal mortality at the grass roots level using health messages through songs created within the community, this will serve as a model for future adaptation. The outcomes of the methods used during the intervention research will motivate local people to further progress and sustain their determination to provide care during pregnancy and childbirth. Since the intervention is designed to be low cost and effective, the Government of Nepal may recognise this method of community education as a model that should be replicated in other parts of Nepal and as evidence for policy reforms. The adaptation of the innovative research methods used here could serve as an example for further research and intervention through community action. The following are the anticipated immediate and long-term outcomes from the intervention: 1. Improved education and practice during pregnancy and childbirth, 2. Improved family responsiveness to ensure care during

pregnancy and childbirth, 3. Increase in the number of antenatal visits, 4. Reduction in the number of delivery complications, 5. Improved pregnancy outcomes, 6. Improved maternal health outcomes through community action and 7. Improved maternal mortality. There is a need for future research to further test these hypotheses.

The community was empowered through their involvement in the program and they established a high level of knowledge through their own efforts, the knowledge that may save lives in the future. The results add to the existing evidence on the design, development and execution of health awareness programs through cultural transformation. Further research would be useful to evaluate outcomes.

### 8.11 Application of the theoretical concepts

Community Organization Model: As previously mentioned, the Community Organisation Model explains that the people are empowered to analyse the situation, identify pathways to address problems and change behaviour through collective decision making and action [244]. The concept of collective decision making for improved action was used in the process of the organisation of the intervention. This process resulted in facilitating the community analysing the root causes of the problem, sharing decision making for actions, identifying specific problems, encouraging each group of people within the community to participating in the intervention and developing capacity for sustained change, all taking place according to the theory [245].

Social Network Theory: There are numerous social networks within the community [246]. We used these networks and positive relations to bring together and impart information. The community organization and composition of the intervention population is distributed matching the concept of Social Network Theory. For example, individuals,

groups/organizations and the community are connected as a society and institute community action for common benefits. Individuals (mothers and students) are connected with grouped organizations (mothers' groups and schools) and the links are the communicative actions. All actions are viewed as interdependent rather than independent. For example, any support given to a pregnant woman during her pregnancy and childbirth will help contribute to creating a healthy and happy community. Everyone in the family and community can play different roles while offering care during pregnancy. The relational ties among people are channels for the transfer of material and nonmaterial resources [300]. The individuals or organizations within the structure establish ties and links. The natural interaction of individuals and groups or organizations establishes relationships. The relationship among these social actors makes an association for collective benefit. This concept was practiced in the process of organising the community for intervention and resulted in positive results. We experienced how social networks influence ideas, relationships, emotions, health, and behaviour within the community.

The Health Belief Model: As per the Model [258], we attempted to understand the local context and possible options for behaviour change. The issue undertaken was a community concern. The interventions were designed to improve community knowledge essential for behaviour change at the community-level. We motivated community people to engage and take leadership roles in the program.

In the process of intervention, the concept of the models discussed were utilised. In particular, the concepts of Social Network Theory were identified and utilised to encourage groups to contribute in developing health songs. The identification of the potential strengths of the social networks further contributed to disseminate health messages by the locals throughout the communities. It is important that further evidence

of the application and adaptation of these theoretical concepts in community health promotion is established.

### 8.12 Limitations

Some limitations of the study should be noted. Our study addressed knowledge change but was not designed to detect potential consequential changes in behaviour or maternal mortality. Although there was no loss of knowledge at 12-month follow-up, it is not known how long the acquired knowledge will be retained within the community, nor whether knowledge will translate into altered behaviour. Similarly, the intervention and control group were not completely comparable, with a difference in knowledge pre-intervention. Another limitation is that the researchers could not confirm that it was always the same respondent who was interviewed at baseline, post-intervention and the 12-month follow-up surveys. Executing an intervention research that involved the community in each stage of planning, discussion and implementation was time consuming. Due to a lack of time and resources, it was not possible to offer complete intervention packages to the control population even after the results were significant. However, we managed to distribute the Holy Duty wall chart to the control population.

### 8.13 Rigour considerations

The research protocol was developed on the basis of the evidence. In the process of developing and finalising the project, the researcher sought ethics approval from the University of Newcastle, Australia, and the Nepal Health Research Council, Nepal and consulted with local people to make sure that the practices chosen were appropriate for the cultural and traditional landscape. A daily diary of the activities undertaken was maintained.

### 8.13.1 Trustworthiness

All the surveys were carried out using an online survey system. The records collected were uploaded in the survey system (SurveyGizmo) and securely analysed. Consent records were securely preserved in the safe of Hunter Medical Research Institute, University of Newcastle, Australia. All the research conducted was performed as per the approved guidelines and within the time allocated by the University of Newcastle, Australia.

### 8.13.2 Credibility

Data was collected in the respondents' natural environment by an online survey through interviews. The whole community was informed of the surveys and participants consented to the data collection.

### 8.13.3 Dependability

Survey data were collected verbally by data collection assistants (interviewers) who entered the data via tablets (iPads). Responses were later uploaded to a remote, secure, online survey system. Quality checks were undertaken during data upload and cross-checked at the time of data analysis. The events and the comments of the locals regarding the interventions were also documented in the video and still photographs.

## 8.14 Research implications for Policy

Evidence should be the foundation for policies [301]. The relation between research findings and policy is linear [302]. Evidence-based policies are essential in all sectors, particularly in health policy development. However, research currently has inadequately direct influence on health policies that impact on the system and the services everywhere [303]. It is a global challenge that governments are driven by specific ideologies, for

example, economic theory, financial rigidity and political convenience [304]. Policymakers may have different goals other than health effectiveness, for example, financial, electoral, social and political strategic development [303]. Therefore, it is challenging for research findings to influence government policies. In addition to these aspects, policy makers need to be involved in the processes to conceptualise the conduct and implications of the research [303]. In the absence of processes, the research findings that are supposed to impact systems and lives may risk being ineffective. The research undertaken in the rural villages of Nepal informed and included all stakeholders from the community through to the national levels. For example, policy makers were informed, oriented and involved in different stages of the intervention.

The findings of this study are of significant importance for program planning and implementation in rural settings such as in Nepal. This study offers evidence for all policy makers, planners, strategists, program managers and researchers to consider the local context and the importance of community embedding and community leadership in improving learning outcomes on health issues. It is evident that to make programs suitable to local needs, policy makers will benefit from understanding the specific factors that influence decisions in seeking care and that inter-sectoral coordination is essential for lasting behaviour change [305]. The results of the study showed that marriage is an important factor in the efficacy of the intervention; programs will be more effective if they are designed for a specific audience. Other prominent findings that have implications for program strategies were that non-married participants had the lowest knowledge at baseline and had the largest improvement after the intervention. Similarly, participants with no education experienced the highest increase in knowledge between baseline and follow-up. The culturally inclusive methods of intervention and the engagement of local youths might have motivated the non-married to be concerned with the messages

delivered. Although the singing intervention was suitable for all sub-groups of the population, it was significantly effective for those who are low educated, non-married and of low-income.

### 8.14.1 Policy decisions already made

As evidenced, improving accessibility to a health facility particularly during labour is an important factor for maternal survival. Based on the experience gained from the intervention research and evidence from the literature, we consistently engaged in discussions with the key health executives, including Ministers and the Chair of the National Assembly, to improve transportation, including emergency transportation. As a result of this continued lobbying the following policy decisions have been enacted:

#### 8.14.1.1 Decision 1

A program with a budget (Nepalese Rupees 295,700,000) (AUD 3,696,250) allocation has been instituted under the President's Women's Empowerment Program. The specific priorities of the newly instituted program are as follows: developing women's skills to improve status, fighting against traditional practices that subjugate women, and providing an air ambulance for retrieval of emergency obstetric cases in rural and remote locations.

#### 8.14.1.2 Decision 2

The transport reimbursement incentive provided to access institutional delivery has been increased by 100%. This has huge financial implications as it will target more than 600,000 estimated deliveries annually.

#### 8.14.1.3 Decision 3

The monetary incentive provided against the completed four antenatal visits (as recommended by the government) is increased by 100%. This policy change will have a significant impact on the management of complicated cases, reducing delivery complications and improving maternal outcomes. Similarly, this incentive will target more than 600,000 pregnant women, it has huge financial implications.

As we learnt from the literature, that the maternal mortality in the remote districts is better than those accessible districts. We also found that this information is quite misleading as the majority of the births take place at home [94]. Unskilled deliveries pose a high risk of maternal death. In rural and remote settings maternal outcomes are not recorded [31, 95]. Surprisingly, maternal deaths that occur at home or on the way to health facilities remain largely unrecorded [30, 31]. This situation is a serious issue in terms of planning and resource allocation to improve maternal mortality. It could further disadvantage those already disadvantaged due to faulty planning and resource allocation made on the basis of such systematic errors. This was something we repeatedly discussed with senior health executives to consider improvements.

#### 8.14.1.4 Decision 4

A policy decision with a budget has been made to improve the system that traces and records each maternal death, and the information is linked to the National Health Management Information System.

### 8.15 Efforts to translate the knowledge to improve maternal outcomes in Nepal

Further actions (presentation, orientation, advocacy and lobbying) at all levels possible to improve the maternal mortality situation, particularly in the remote situation of Nepal,

will be carried out. Specific projects such as community education and engagement to improve maternal outcomes will be designed, developed and implemented. The government of Nepal, and local and external development partners including the donor community will be approached for meaningful engagement in community-based maternal care initiatives. A model of community led maternal care will then be presented to the national and international communities for replication with local adaptation.

### 8.16 Future research

Worldwide maternal mortality, particularly in low-resource economies like Nepal, is unacceptably high. We carried out a public health education program addressing maternal mortality in a remote hill district of Nepal using songs and a wall chart to convey key maternal health messages. The messages were defined with expert assistance, but the program involved every section of the community to fine-tune it to local sensibilities. The messages were designed to educate family members with limited literacy and to account for sociocultural conditions where women were in a subservient role. Survey results showed a significant and lasting improvement in the knowledge of the intervention population compared to the control. This demonstrates that effective community education programs must address community needs, and respect local culture and talent, if they are to achieve long-term positive changes in knowledge, attitude and practices. Further research on community education using methods that are suitable to the local cultural context and exiting policies would be helpful.

# Chapter Nine A
# Policy Brief

## POLICY IMPLICATIONS OF FINDINGS FROM THE REVIEW OF NEPAL'S SAFE MOTHERHOOD POLICY 1998

**Problem:** The provision of maternal health services is not distributed equitably. For example, in some areas, particularly urban areas, maternal services are underused while many rural areas have no, or extremely limited, services [306]. Even where hospital services are available for women having children, the outcomes are unsatisfactory. For example, if a mother did not have antenatal care, the potential risk of complications remains high, even when she accesses a hospital for the birth. The lack of both health services and health care information combine to result in poor maternal outcomes, this is a particular issue in rural areas [55]. The sociodemographic structure of the population has been increasingly changing. For example, young people now make up 32.5% and adolescents 23.6%, of the total population [307]. This large cohort of young people demonstrates an increased need to address sexual and reproductive health issues. In these contexts, the Safe Motherhood Policy 1998 has been ineffective in driving robust programs to fulfil national and international commitments that Nepalese government has made and achieve targets related to maternal health outcomes. These issues have stimulated national policy discussions with a view to developing a new safe motherhood policy in Nepal.

**Aims:** a) To review Nepal's Safe Motherhood Policy 1998. b) To provide evidence for the Nepalese government to develop a new Safe Motherhood Policy.

**Who is this policy review for?** Government of Nepal, Ministry of Health and Population, Department of Health Services, Family Health Division, health planners, strategists, programmers, researchers and district health teams.

**Review findings:** Nepal's Safe Motherhood Policy (1998) is no longer effective. Most of the key maternal health use indicators, such as uptake of antenatal care, use of skilled birth attendants, institutional delivery, and postnatal care are not increasing rapidly enough to meet the targets. Poor-quality data and inadequate reporting systems are other challenges related to the health information system, which makes tracking maternal mortality measurements problematic [96]. Despite this underreporting, maternal mortality in Nepal (190 per 100,000 live births) is one of the highest in Asia, and among the top ten in the world [97]. In the remote rural districts of Nepal the maternal mortality ratio is double the national estimate [98] making it 380 per 100,000 live births [99]. However, as most births without skilled care occur at home [100] and maternal outcomes are not registered [31, 95] the true figure for rural Nepal is likely to be much higher. These findings underscore the need for a formal revision of the policy.

**Key challenges:** Ineffective policy, inadequate services, particularly in the rural communities. There is a huge gap in the provision of maternal health services between the urban and rural population [308]. Furthermore, in the rural remote villages of Nepal, people lack basic health information, which is complicated by low literacy levels.

**Key policy options:** Development of a new policy based on the assessment of current policy, strategy, programs and outcomes. Community education with essential health messages that is suitable to local culture and limited literacy environment can significantly improve the knowledge of locals essential for behaviour change.

**Recommended strategic objectives:** It is essential to develop a new Safe Motherhood Policy to replace the current policy that was developed in the year 1998. The overarching aim of the policy is to reduce maternal mortality. The new policy should:

1. plan a road map to improve maternal outcomes based on the available evidence
2. improve the functional referral system by improving retention of staff, medical supplies and training health care providers, with a particular focus at the local level
3. improve the health workforce both by increasing the number and essential training required
4. improve health infrastructure by allocating adequate budget for logistics and building
5. improve the logistics management system by improving planning for logistics, distribution system and provision of training on logistics management information system
6. improve the health management information system by improving the recording and reporting system, particularly information related to maternal events
7. improve community education approaches by adapting culturally appropriate methods, for example, using traditional messaging techniques: education through singing health messages that are suitable to local culture of the people in the rural areas and limited literacy settings is an example of such a program
8. improve coordination and communication amongst the key stakeholders for optimal outcomes through sharing the system data and organising periodic review and planning workshops and meetings
9. develop intra- and inter-sectoral coordination by shared planning, action, reviews and feedback for improved maternal health and outcomes
10. improve resource allocation for safe motherhood programs
11. design and develop the policy to match the current Federal, Provincial and Local structure

12. set new targets on the basis of the Constitution, Sustainable Development Goals (SDGs) and Nepal Health Sector Strategy III (NHSS)

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# Chapter Nine B
# Conclusion

Evidence shows that maternal mortality in rural Nepal is double the national estimates. Ignorance of appropriate care during pregnancy and childbirth, unsupportive sociocultural practices and poor health care systems are the main causes of the high ratio of maternal death. In remote rural villages, most deliveries take place at home without the help of health workers. Unskilled deliveries pose a high risk of maternal death. In rural settings, maternal outcomes are not recorded. Surprisingly, even maternal deaths that occur at home or on the way to health facilities remain unrecorded, leading to faulty planning and resource allocation.

We considered educating the community as an important and essential first step. Identifying suitable methods of community education was a critical stage of the program design. In addition to a review of the literature, we carried out in-depth discussions on the sociocultural practices of the research population in order to identify suitable ways to achieve community education. Given the importance of singing in everyday life to rural Nepalese people, we devised an intervention program that imparts key health messages through singing and dancing.

We engaged all sections of the community in the design and development and implementation of the interventions. In the process, community leadership played an important role in ensuring male involvement, particularly of husbands and fathers-in-law in the program. This involvement was crucial in order to create an environment in which maternal care decisions made by mothers-in-law and/or health care providers were supported by the men who control the finances. The intervention not only informed villagers of the key health messages, but also generated a great sense of family and

community responsibility for safer pregnancy and childbirth. In addition to these community benefits, involving school students in the intervention helped develop an informed cohort of future parents. The development and use of a Holy Duty wall chart that is culturally suitable was another aspect of successful engagement with both the community and the government for community education. There was a remarkable change in the practices of the local people, particularly the males. For example, after the song competition, the local teachers (mostly men), came forward to take the education program to the next (individual household and hamlet) level through singing and dancing the health messages. This was an important commitment demonstrated by the male teachers within the community. This momentum encouraged other males (traditional healers, singers, politicians, opinion leaders and village officials) to take part in the intervention actively. Before the intervention, it was a taboo for males to discuss pregnancy and childbirth issues. Most unexpectedly, after the intervention, the situation has reversed. Data suggest that each pregnancy is discussed and has been a subject of family and community responsibility. Now in the intervention village settings, the culture of maternal care has completely transformed. For example, pregnancy and childbirth issues are never left undiscussed. It is unusual for any family to remain ignorant and inactive regarding pregnancy and birth.

The result of the research has been considered by the government of Nepal. The government announcement for the provision of an air ambulance, increased incentives for institutional delivery, four antenatal visits and improved recording and reporting of maternal mortality are some of the important policy decisions already made to improve maternal health outcome as a result of this project. We conclude that if community education programs are designed, developed and executed properly, address the community's felt needs, and respecting local culture and talent, then long-term positive

changes in the knowledge, attitude and practices both at the community and government levels can be realised.

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# Appendices

**Appendix 1: Baseline and post-intervention questionnaire**

**Safer Pregnancy and Childbirth: Knowledge, Attitude and Behaviour Survey**

Surveyors are to complete this basic demographic section for every subject ID, whether it participates or not in the survey.

1. Date of interview *
2. Respondent's ID? *
3. Survey *
    Baseline survey
    Post-intervention survey
4. Name of research cluster *
    Intervention
    Control (go to question 6)
5. Name of Village Development Committee (intervention) *
    Chitre (go to question 7)
    Ramja Deurali (go to question 7)
6. Name of Village Development Committee (control) *
    Mudikuwa
    Falebas Khanigaun

Next question indicates consent of respondent to participate or not in the survey.

Instructions for interviewer -

Fill in the basic information which you do not need to ask to the respondent. Introduce yourself to respondent in following wording and format;

Hello, my name is (interviewer's name), and I am, on behalf of the University of Newcastle conducting a research project about pregnancy and childbirth. Here is some information about the project (hand over the information statement sheet, read statement out loud to the respondent if they have difficulty reading).

7. Would you like to take part in this survey by providing the information related to pregnancy and childbirth? *

Yes (logic applies: to continue with the interview)

No (logic applies: to close the interview)

8. Ward Number *

**Personal information**

Instructions for interviewer –

Say - now I'm going to ask a few questions about your personal information.

9. What is your contact mobile number (if applicable)? (Must be numeric)

10. Who owns this mobile?

Own mobile phone, Family contact, No mobile phone in the family

11. What is your age? *

12. What is your sex? *

Male

Female

13. What is your marital status? *

Never married (go to question 16)

Married

Separated

Divorced

Widowed

14.What was your age at first marriage? *

Less than 10 years

10-14 years

15-19 years

20-29 years

30-34 years

≥ 35 years

15.What was your age when you had the first child? *

No children

15-19 years

20-29 years

30-34 years

≥ 35 years

16. What is your highest educational attainment? *

No education

Primary (class 1-5)

Secondary (class 6-10)

Higher (class 11 and above)

**Economic situation related information**

Instructions for interviewer –

Say- "Now, I am going to ask you about the family income situation" (Must be numeric).

17. How many people are there in the household? *

18. Does anyone in the household have paid employment? *

Yes

No (go to question 20)

19. What is the number of males and females that have paid employment in the family? * (Must be numeric)

None

One (Male, Female)

Two (Males, Females)

Three (Males, Females)

Four (Males, Females)

Five or more (Males, Females)

20. What is the household income / annually? (in Nepalese Rupees) *

Less than 10,000

10,000 - 49,000

50,000 - 99,000

100,000 - 299,000

300,000 - 499,000

500,000 - 999,000

100,0000 - 199,9000

=> 200,0000

I do not know

21. How difficult or easy is it to manage on the income you have available? *

It is impossible

It is difficult all the time

It is difficult some of the time

It is not too bad

It is easy

I do not know

**Antenatal care related information**

Instructions for interviewer –

Say – "Now I am going to ask a few questions related to pregnancy and childbirth".

22. How important is an antenatal check-up? *

    Not at all important (go to question 25)

    Somewhat important

    Very important

    It is essential

    I do not know (go to question 25)

23. What is the importance of an antenatal check-up? Choose 1 or more. *

    Risk assessment

    Treatment of complications

    Vaccination against Tetanus

    Receive iron tablets

    Advice for childbirth

    All of the above

    It is not essential

    I do not know

24. How many times should a pregnant woman attend an antenatal check-up? *

    Once

    Twice

    Three times

    Four times

    More than four times

    I do not know

**Delivery related information**

25. How important is institutional delivery? *

    Not at all important (go to question 27)

    Somewhat important

    Very important

    It is essential

    I do not know

26. What is the benefit of institutional delivery? Choose 1 or more. *

Early diagnosis and care

Help reduce risk of complications

Timely management of complications

Easy delivery

Reduces the risk of death

I do not know

27. How important is skilled delivery (delivery with the help of trained staff) at home? *

Not at all important (go to question 29)

Somewhat important

Very important

It is essential

I do not know (go to question 29)

28. What is the benefit of skilled delivery? Choose 1 or more. *

Early diagnosis and care

Help reduce risk of complications

Timely management of complications

Easy delivery

Reduces the risk of death

I do not know

**Pregnancy history related information**

29. Are there any pregnancies in the family? *

Yes (if there is more than one pregnancy, consider the women with the most advanced
pregnancy)

No

30. How many weeks of pregnancy? *

0-12 weeks

13-24 weeks

25-36 weeks

37 weeks or more

31. Has there been any discussion within the family about pregnancy / childbirth related plans? *

Yes

No (go to question 34)

32. Who participated in the discussions? *

Pregnant woman

Mother-in-law of pregnant woman

Father-in-law of pregnant woman

Husband

Female Community Health Volunteer (FCHV)

Anyone else

33. What were the decision about pregnancy and childbirth? Choose 1 or more. *

Decided to inform and consult Female Community Health Volunteer

Decided to attend antenatal examinations

Decided to attend a health facility for childbirth

Decided to call skilled midwife at birth

Decided to call traditional birth attendant

Decided to go to the traditional healer

Decided to do nothing

No decisions were made

**Practice during pregnancy and childbirth related information**

34. How many times has the pregnant woman visited a health facility for an antenatal examination? *

None

Once

Twice

Three times

Four or more times (go to question 36)

I do not know (go to question 36)

35. If fewer than four times (or fewer than the recommended visit(s) according to the weeks of pregnancy); why? *

Distant health facility

No medicine at health facility

No health staff at health facility

Lack of money

Unknown benefit of attending a health facility

The other visit(s) yet to be made as schedule is/are due

Any other reason(s);

36. How many times did the pregnant woman consult the Female Community health Volunteer during pregnancy? *

None

Once (go to question 38)

Twice (go to question 38)

Three times (go to question 38)

Four or more times (go to question 38)

I do not know (go to question 38)

37. If none; why? *

Distant health facility

No medicine available at the health facility

No health worker available in the health facility

Lack of money

Unknown benefit of consulting health worker

She is due to visit to the health facility

Any other reason(s);

**Pregnancy and childbirth management related information**

Now I am going to ask you about the previous experiences of pregnancy and childbirth management

38. Has anyone in your family been pregnant in the past (last five years)? *

Yes

No (go to question 47)

39. Did /do you think it was necessary to inform the Health Worker / Female Community Health Volunteer about the pregnancy? *

Yes

No

40. Did you inform the Health Facility/ Health Worker / Female Community Health Volunteer about the pregnancy? *

Yes

No

41. Where did the delivery/childbirth take place?

At a health facility

On the way to a health facility

With the assistance of a trained nurse at home

At home without trained staff

42. Who was involved with childbirth management issues? *

Husband

Mother-in-law of pregnant woman

Father-in-law of pregnant woman

Aunty of pregnant woman

Neighboring sisters

Neighbor

Female Community Health Volunteer

Health worker

**Support during pregnancy and complications related information**

43. For each of the following people list in order of who played the most supportive role during pregnancy and childbirth? (1=most supportive role, 8= least supportive role) If any person is not applicable leave it blank

Husband

Mother-in-law

Father-in-law

Aunty

Neighboring sisters

Neighbor

Female Community Health Volunteer

Health Worker

44. Were there any pregnancy complication(s) in previous pregnancies in the family? *

Yes

No (go to question 47)

45. If yes; what were the complication(s)? *

High blood pressure

Pre-term labor

Abortion

Other

46. What were the pregnancy outcomes of previous pregnancies (last five years) in the family? (select the number against event experienced)

Normal delivery

Stillbirth

Postnatal infection

Maternal death

Infant death

Mother and infant death

**Supplementary diet and rest during pregnancy related information**

Instructions for interviewer –

Say – "Now there will be a few questions about diet and rest during pregnancy"

47. Do pregnant women need to supplement their diet and take extra food during pregnancy? *

Yes

No (go to question 51)

I do not know (go to question 51)

48. What kind of food should be given to a pregnant woman? *

Rice

Vegetables

Fish and meat

Maize

I do not know

49. How frequently should a pregnant woman eat food? *

Every two hours

Every four hours

Every six hours

Every eight hours

I do not know

50. If there has been a pregnant woman in your family, what changes were made to her diet or the quantity of food taken during pregnancy? (if on question 29 and / or 38 was answered, there was pregnancy)

No pregnant woman in the family

More in quantity

More in frequency

More in variety,

Specify: (eggs, chicken, mutton, fruit, milk or any others)

51. Do pregnant women need rest during pregnancy? *

It is necessary

It is not necessary (go to question 54)

I do not know (go to question 54)

52. How many hours in a day should a pregnant woman rest? *

0-4 hours

5-6 hours

7-10 hours

More than 10 hours

I do not know

53. How often should a pregnant woman take rest with the weight off her feet? *

Every two hours

Every four hours

Every six hours

Every eight hours

I do not know

54. If there has been a pregnant woman in your family, was she given time to rest during her pregnancy? * (if on question 29 and / or 38 was answered, there was pregnancy)

Yes

No

I do not know

**Childbirth planning related information**

55. Is planning and preparation for childbirth important? *

Not at all important (go to question 57)

Somewhat important

Very important

It is essential

I do not know (go to question 57)

56. Who should be involved in planning and preparation for childbirth? *

Mother-in-law of pregnant woman

Father-in-law of pregnant woman

Husband

Female Community Health Volunteers

Pregnant woman

I do not know

57. When should they inform Health Worker or Female Community Health Volunteer prior to the expected date of delivery? *

Two months prior to expected date of delivery

One month prior to expected date of delivery

Two weeks prior to expected date of delivery

One week prior to expected date of delivery

It is not necessary to inform Health Worker or Female Community Health Volunteer

I do not know

58. If family members plan to take the pregnant woman to a health facility for childbirth, how many days in advance should the plan of transportation be finalized? *

One day prior to expected date of delivery

Four days prior to expected date of delivery

One week prior to expected date of delivery

Two weeks prior to expected date of delivery

It is not necessary

I do not know

59. Would you like to add more about your and your family's experiences of pregnancy and childbirth?

Thank you for taking our survey. Your response is very important to us.

**Appendix 2: Baseline and post-intervention survey questionnaire – Nepali**

## सुरक्षित गर्भधारण र प्रसुतिः ज्ञान, व्यवहार र बानी सम्बन्धि सर्भे

१.मिति:

२.प्रतिक्रिया / जानकारी दिनेको संकेत नम्बर:

३.सर्भे:

- ◯ आधारभूत सर्भे (Baseline survey)
- ◯ पोस्ट-इनर्टभेन्सन सर्भे (post- Intervation survey)

४. अनुसन्धान समूह (research cluster)

- ◯ इनर्टभेन्सन (Intervention)
- ◯ कन्ट्रोल (control) (प्रश्न नं ६ मा जानुहोस्)

५. गाऊँ विकास समिति - Intervention

- ◯ चित्रे ( प्रश्न नं ७ मा जानुहोस् )
- ◯ राम्जा देउराली ( प्रश्न नं ७ मा जानुहोस् )

६. गाऊँ विकास समिति - control

- ◯ मुडिकुवा
- ◯ फलेवास खानी गाऊँ

७. के तपाई यस सर्भेमा भाग लिई गर्भधारण र प्रसुतिबारे सुचना दिन चाहनुहुन्छ ?

- ◯ चाहन्छु (अन्तर्वाता जारी राख्नुहोस्, प्रश्न नं ६ सम्मको जानकारी आफैंले भरि प्रश्न नं ७ देखि प्रतिक्रिया दिने व्यक्तिसंग सोध्नुहोस् )
- ◯ चाहन्न ( अन्तर्बाता बन्द गर्नुहोस्)

**व्यक्तिगत जानकारी**

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## सुरक्षित गर्भधारण र प्रसुतिः ज्ञान, व्यवहार र बानी सम्बन्धि सर्भे

८. वडा नं

- ◯ १
- ◯ २
- ◯ ३
- ◯ ४
- ◯ ५
- ◯ ६
- ◯ ७
- ◯ ८
- ◯ ९

९. मोबाईल नम्वर( यदि उपलब्ध भएमा):

[ ]

१०. मोबाइल धनी

- ◯ आफ्नै मोबाइल भएको
- ◯ पारिवारिक सम्पर्क
- ◯ पारिवारमा मोबाइल नभएको

११.उमेर

[ ]

१२.लिङ्ग

- ◯ महिला
- ◯ पुरुष

१३. वैवाहिक अवस्था

- ◯ अविवाहित ( यदि यस उत्तर आएमा; प्रश्न नं १६ मा जाने )
- ◯ विवाहित

- ◯ भिन्न बस्ने
- ◯ सम्बन्ध विच्छेद
- ◯ विधवा

१४. पहिलो विवाहको उमेर

- ◯ १० बर्ष भन्दा कम
- ◯ १०-१४ वर्ष
- ◯ १५- १९ वर्ष
- ◯ २०-२९ वर्ष
- ◯ ३०-३४ वर्ष
- ◯ ३५ वर्ष वा सो भन्दा माथि

१५. पहिलो बच्चा हुदाँको उमेर

- ◯ बच्चा नभएको
- ◯ १५- १९ वर्ष
- ◯ २० - २९ वर्ष
- ◯ ३० - ३४ वर्ष
- ◯ ३५ वर्ष भन्दा माथि

१६. शिक्षा ( उच्च तह प्राप्त)

- ◯ अशिक्षित
- ◯ प्रथामिक तह (कक्षा १ देखि ५)
- ◯ माध्यमिक तह (कक्षा ६ देखि १० )
- ◯ कक्षा ११ वा सो भन्दा माथि

**आर्थिक जानकारी**

१७. तपाईको परिवारमा कति जना हुनुहुन्छ ?

१८. तपाईको परिवारमा कोही सदस्य रोजगार हुनुहुन्छ ?

◯ छ
◯ छैन ( यदि छैन भने प्रश्न नं २० मा जानुहोस् )

१९. कति जना महिला तथा पुरुष रोजगार हुनुहुन्छ ?

| | छैन | एक जना | दुई जना | तिन जना | चार जना | पाँच जना वा सो भन्दा बढी |
|---|---|---|---|---|---|---|
| महिला | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| पुरुष | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

२०. तपाईको परिवारमा वार्षिक आम्दानी कति हुन्छ ( नेपाली रुपैयाँमा)?

◯ १० हजार देखि ४९ हजार सम्म
◯ ५० हजार देखि ९९ हजार सम्म
◯ १ लाख देखि २ लाख ९९ हजार सम्म
◯ ३ लाख देखि ४ लाख ९९ हजार सम्म
◯ ५ लाख देखि ९ लाख ९९ हजार सम्म
◯ १० लाख देखि १९ लाख ९९ हजार ९ सय सम्म
◯ २० लाख वा सो भन्दा बढी
◯ मलाई थाह छैन

२१. यस आम्दानीबाट परिवार चलाउन कतिको गाह्रो तथा सजिलो छ ?

◯ असम्भव छ
◯ सधैं गाह्रो हुन्छ
◯ कहिले काही गाह्रो हुन्छ
◯ त्यति नराम्रो छैन
◯ सजिलै छ
◯ मलाई थाह छैन

## सुरक्षित गर्भधारण र प्रसुतिः ज्ञान, व्यवहार र बानी सम्बन्धि सर्भे

**स्वास्थ्य जाँच सम्बन्धि जानकारी**

२२. गर्भावस्थामा स्वास्थ्य जाँच गराउनुको महत्व कति छ ?

- ◯ खासै महत्व छैन (यो उत्तर आएमा सिधै प्रश्न नं २५ मा जानुहोस्)
- ◯ केहि महत्व छ
- ◯ धरै महत्व छ
- ◯ आवश्यक छ
- ◯ मलाई थाह छैन (यो उत्तर आएमा सिधै प्रश्न नं २५ मा जानुहोस्)

२३. गर्भावस्थामा स्वास्थ्य जाँच गराउनुका के के फाईदा छन् ?

- ◯ खतरा मूल्यांकन
- ◯ जटिलता उपचार
- ◯ धनुष्टंकारविरुद्धको खोप
- ◯ आईरन(Iron ) चक्की लिन
- ◯ सुत्केरीबारे सुझाव लिन
- ◯ माथिका सबै
- ◯ यो आवश्यक छैन
- ◯ मलाई थाह छैन

२४. तपाईको विचारमा गर्भावस्थामा कति पटक जाँच गर्नुपर्ला ?

- ◯ १ पटक
- ◯ २ पटक
- ◯ ३ पटक
- ◯ ४ पटक
- ◯ ४ पटक भन्दा बढी
- ◯ मलाई थाह छैन

**सुत्केरी सम्बन्धि सामान्य जानकारी**

२५. स्वास्थ्य संस्थामा सुत्केरी गराउनु कत्तिको महत्वपूर्ण छ ?

- ◯ खासै महत्व छैन (यो उत्तर आएमा सिधै प्रश्न नं २७ मा जाने )

- ◯ केहि महत्व छ
- ◯ धरै महत्व छ
- ◯ आवश्यक छ
- ◯ मलाई थाह छैन (यो उत्तर आएमा सिधै प्रश्न नं २७ मा जानुहोस्)

२६. स्वास्थ्य संस्थामा सुत्केरी गराउनुका फाईदाहरु के के छन् ?

- ◯ अग्रिम पहिचान र हेरचाह
- ◯ जोखिम कम गर्ने
- ◯ जटिलताको समयमै व्यवस्थापन
- ◯ सजिलै सुत्केरी हुने
- ◯ मृत्युको खतरा न्यूनीकरण
- ◯ मलाई थाह छैन

२७. दक्ष प्राविधिकबाट घरमै सुत्केरी गराउनु कतिको महत्वपूर्ण छ ?

- ◯ खासै महत्व छैन (यो उत्तर आएमा सिधै प्रश्न नं २९ मा जानुहोस् )
- ◯ केहि महत्व छ
- ◯ धरै महत्व छ
- ◯ आवश्यक छ
- ◯ मलाई थाह छैन (यो उत्तर आएमा सिधै प्रश्न नं २९ मा जानुहोस् )

२८. दक्ष प्राविधिकबाट सुत्केरी गराउनुका फाईदा के के छन् ?

- ◯ अग्रिम पहिचान र हेरचाह
- ◯ जोखिम कम गर्ने
- ◯ जटिलताको समयमै व्यवस्थापन
- ◯ सजिलै सुत्केरी हुन
- ◯ मृत्युको खतरा न्यूनीकरण
- ◯ मलाई थाह छैन

२९. तपाईको परिवारमा कोही गर्भवती हुनुहुन्छ ?

- ◯ छ ( एक भन्दा बढी सुत्केरी भएमा सबै भन्दा बढी समय पुगेकालाई आधार मान्ने )

◯ छैन

३०. गर्भवती भएको कति हप्ता पुग्यो ?

◯ ०-१२ हप्ता
◯ १३- २४ हप्ता
◯ २५- ३६ हप्ता
◯ ३७ हप्ता वा सो भन्दा बढी

३१. तपाईको परिवारमा गर्भावस्था र सुत्केरी सम्बन्धि योजनाबारे छलफल भएको थियो ?

◯ भएको थियो
◯ भएको थिएन ( थिएन भने प्रश्न नं ३४ मा जानुहोस् )

३२. छलफलमा को को सहभागी हुनुभएको थियो ?

◯ गर्भवती महिला
◯ सासु
◯ ससुरा
◯ श्रीमान
◯ महिला स्वास्थ्य स्वयंसेविका
◯ अन्य कोहि

३३. गर्भावस्था र सुत्केरीबारे के विषयमा छलफल केन्द्रित थियो ?

◯ महिला स्वास्थ्य स्वयंसेविकालाई जानकारी गराउने बारे निर्णय भयो
◯ गर्भावस्थामा जाँच गराउने बारे निर्णय भयो
◯ सुत्केरी गराउन स्वास्थ्य जाने निर्णय भयो
◯ दक्ष प्राबिधिक बोलाउने निर्णय भयो
◯ सुडेनी बोलाउने निर्णय भयो
◯ धामी कहाँ जाने निर्णय भयो
◯ केहि पनि नगर्ने निर्णय भयो
◯ केहि पनि निर्णय गरिएन

## सुरक्षित गर्भधारण र प्रसुतिः ज्ञान, व्यवहार र बानी सम्बन्धि सर्भे

३४. गर्भावस्था जाँच गराउन गर्भवती महिला कतिपटक स्वास्थ्य संस्था जानुभयो ?

- ◯ जानुभएन
- ◯ एक पटक जानुभयो
- ◯ दुई पटक जानुभयो
- ◯ तिन पटक जानुभयो
- ◯ चार पटक अथवा सो भन्दा बढि (यदि यस उत्तर आएमा प्रश्न नं ३६ मा जानुहोस्)
- ◯ मलाई थाह छैन (यदि यस उत्तर आएमा प्रश्न नं ३६ मा जानुहोस्)

३५. यदि चार पटक भन्दा कम ( अथवा गर्भावस्था अनुसार तोकिएको भन्दा कम ) भएमा ; किन ?

- ◯ स्वास्थ्य संस्था टाढा भएर
- ◯ स्वास्थ्य संस्थामा औषधि नभएर
- ◯ स्वास्थ्य संस्थामा प्राविधिक नभएर
- ◯ पैसा नभएर
- ◯ स्वास्थ्य संस्थामा जानुको फाईदा थाहा नभएर
- ◯ स्वास्थ्य जाँच गराउन बाँकी नै छ
- ◯ अन्य कारणहरु

३६. गर्भवती महिलाले कति पटक स्वास्थ्य स्वयंसेविका संग सल्लाह लिनु भयो ?

- ◯ जानुभएन
- ◯ एक पटक जानुभयो (यदि यस उत्तर आएमा प्रश्न नं ३८ मा जानुहोस्)
- ◯ दुई पटक जानुभयो (यदि यस उत्तर आएमा प्रश्न नं ३६ मा जानुहोस्)
- ◯ तिन पटक जानुभयो (यदि यस उत्तर आएमा प्रश्न नं ३६ मा जानुहोस्)
- ◯ चार पटक अथवा सो भन्दा बढि (यदि यस उत्तर आएमा प्रश्न नं ३६ मा जानुहोस्)
- ◯ मलाई थाह छैन (यदि यस उत्तर आएमा प्रश्न नं ३६ मा जानुहोस्)

३७. यदि नालिएको भय; किन ?

- ◯ स्वास्थ्य संस्था टाढा भएर

- ◯ स्वास्थ्य संस्थामा औषधि नभएर
- ◯ स्वास्थ्य संस्थामा प्राविधिक नभएर
- ◯ पैसा नभएर
- ◯ स्वास्थ्य संस्थामा जानुको फाईदा थाहा नभएर
- ◯ स्वास्थ्य जाँच गराउन बाँकी नै छ
- ◯ अन्य कारणहरु

[ ]

**गर्भावस्था र सुत्केरी व्यवस्थापन**

३८. तपाईको परिवारमा विगत पाँच वर्षमा कोही गर्भवती हुनु भएको छ ?

- ◯ छ
- ◯ छैन (छैन भने प्रस्न नं ४७ मा जानुहोस् )

३९. के तपाईलाई सुत्केरी अवस्थाबारे महिला स्वास्थ्य स्वयंसेविका / स्वास्थ्य प्राविधिकलाई जानकारी गराउनु आवश्यक छ जस्तो लाग्छ ?

- ◯ आवश्यक छ
- ◯ आवश्यक छैन

४०. तपाईले महिला स्वास्थ्य स्वयंसेविका / स्वास्थ्य प्राविधिकलाई जानकारी दिनुभयो ?

- ◯ दिए
- ◯ दिईन

४१. सुत्केरी कहाँ गराउनु भयो ?

- ◯ स्वास्थ्य संस्थामा
- ◯ स्वास्थ्य संस्था जाँदै गर्दा
- ◯ घरमै नर्सको सहयोगमा
- ◯ स्वास्थ्य प्राबिधिक विना घरमै

४२. सुत्केरी व्यवस्थापनको लागी को को सक्रिय हुनुभएको थियो ?

- ◯ श्रीमान
- ◯ सासु
- ◯ ससुरा
- ◯ काकी
- ◯ छिमेकि दिदीहरु
- ◯ छिमेकि
- ◯ महिला स्वास्थ्य स्वयंसेविका
- ◯ स्वास्थ्य प्राबिधिक

**सुत्केरी हुँदा तथा गाह्रो पर्दा सहयोग**

४३. गर्भावस्था र सुत्केरी अवस्थामा कसले महत्वपूर्ण भूमिका खेलेको थियो ?

( **८ : सबैभन्दा धेरै , १: सबैभन्दा थोरै** )

( आवश्यक नपरेको विकल्प खाली छोद्नुहोस् )

| | १ | २ | ३ | ४ | ५ | ६ | ७ | ८ |
|---|---|---|---|---|---|---|---|---|
| **श्रीमान** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **सासु** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **ससुरा** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **काकी** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **छिमेकि दिदीहरु** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **छिमेकि** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

## सुरक्षित गर्भधारण र प्रसुतिः ज्ञान, व्यवहार र बानी सम्बन्धि सर्भे

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **महिला स्वास्थ्य स्वयंसेविका** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **स्वास्थ्य प्राबिधिक** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

४४. तपाईको परिवारमा पहिले कुनै गर्भावास्थाबारे जटिलता उत्पन्न भएको थियो ?

◯ भएको थियो

◯ भएको थिएन (थिएन भने प्रश्न नं ४७ मा जानुहोस् )

४५.यदि थियो भने, के जटिलता भएको थियो ?

◯ उच्च रक्तचाप

◯ उमेर नपुगी बच्चा जन्मेको

◯ गर्भपतन

◯ अन्य

४६. तपाईको परिवारमा पाँच बर्षमा भएको गर्भधारणका नतिजा के थिए ?

( घटना भए बमोजिमको संख्यामा चिन्न लगाउनुहोस् )

| | १ | २ | ३ | ४ | ५ | ६ |
|---|---|---|---|---|---|---|
| **सामान्य सुत्केरी** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **मृत बच्चा जन्मेको (still birth)** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **सुत्केरी पछिको संक्रमण** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **आमाको मृत्यु** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| **बच्चाको मृत्यु** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

## सुरक्षित गर्भधारण र प्रसुतिः ज्ञान, व्यवहार र बानी सम्बन्धि सर्भे

| | | | | | | |
|---|---|---|---|---|---|---|
| **आमा र बच्चा दुबैको मृत्यु** | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

**थप आहार तथा आराम**

४७. के गर्भवती महिलाले गर्भावस्थामा आफ्नो आहारमा केहि थप खाना समावेश गर्नु जरुरी छ ?

- ◯ जरुरी छ
- ◯ जरुरी छैन (छैन भने प्रश्न नं ५१ मा जानुहोस् )
- ◯ मलाई थाह छैन (यस उत्तर आएमा प्रश्न नं ५१ मा जानुहोस् )

४८. गर्भवती महिलाको आहारमा कस्तो खानाको प्रकार समावेश गर्नु जरुरी हुन्छ ?

- ◯ भात
- ◯ सागसब्जी
- ◯ माछामासु
- ◯ मकै
- ◯ मलाई थाह छैन

४९. गर्भवती महिलाले कति कति समयमा खाना खानु पर्छ ?

- ◯ प्रत्येक २-२ घण्टामा
- ◯ प्रत्येक ४-४ घण्टामा
- ◯ प्रत्येक ६-६ घण्टामा
- ◯ प्रत्येक ८-८ घण्टाम
- ◯ मलाई थाह छैन

५०. तपाईको परिवारमा कोहि गर्भवती हुँदा, उहाँको आहारको प्रकार र मात्रामा के परिवर्तन गर्नु भएको थियो ?

(यदी प्रश्न नं २९ अथवा ३८ मा परिवारमा गर्भवती हुनुहुन्छ भनेमा)

- ◯ परिवारमा कोहि गर्भवती छैन
- ◯ आहारको मात्रा बढाएको

- ◯ आहारको पटक (पहर ) बढाएको
- ◯ आहारमा धरै प्रकार समावेश गरेको
- ◯ ठम्याउनुहोस् : ( अन्डा, कुखुराको मासु , खसीको मासु, फलफुल, दुध अथवा अन्य केहि)

५१. के गर्भावस्थामा आराम गर्नु आवश्यक छ ?

- ◯ आवश्यक छ
- ◯ आवश्यक छैन (छैन भने प्रश्न नं ५४ मा जानुहोस् )
- ◯ मलाई थाह छैन (यस उत्तर आएमा प्रश्न नं ५४ मा जानुहोस् )

५२. गर्भवती महिलाले दिनमा कति घण्टा आराम गर्नु आवश्यक छ ?

- ◯ ०-४ घण्टा
- ◯ ५-६ घण्टा
- ◯ ७-१० घण्टा
- ◯ १० घण्टा भन्दा बढी
- ◯ मलाई थाह छैन

५३. गर्भवती महिलाले कति कति समयमा आफ्नो शरीरको वजन खुट्टामा नपर्ने गरि आराम गर्नु पर्छ ?

- ◯ प्रत्येक २-२ घण्टामा
- ◯ प्रत्येक ४-४ घण्टामा
- ◯ प्रत्येक ६-६ घण्टामा
- ◯ प्रत्येक ८-८ घण्टाम
- ◯ मलाई थाह छैन

५४. यदि तपाईको परिवारमा गर्भवती महिला भएको बेला गर्भावस्थामा आराम गर्न दिनु भएको थियो ? (यदी प्रश्न नं २९ अथवा ३८ मा परिवारमा गर्भवती हुनुहुन्छ भनेमा)

- ◯ दिईएको थियो

- ◯ दिईएको थिएन
- ◯ मलाई थाह छैन

**सुत्केरी सम्बन्धि योजना**

५५. के सुत्केरी गराउन योजना र तयारी महत्वपूर्ण हुन्छ ?

- ◯ खासै हुदैन् (यदि यस उत्तर आएमा प्रश्न नं ५७ मा जानुहोस् )
- ◯ केहि मात्रामा हुन्छ
- ◯ धरै हुन्छ
- ◯ मलाई थाह छैन (यदि यस उत्तर आएमा प्रश्न नं ५७ मा जानुहोस् )

५६. सुत्केरी गराउने तयारी र योजनाका लागि क-कस्लाई समावेश गर्नु अनिवार्य हुन्छ ?

- ◯ सासु
- ◯ ससुरा
- ◯ श्रीमान
- ◯ महिला स्वास्थ्य स्वयंसेविका
- ◯ गर्भवती महिला
- ◯ मलाई थाह छैन

५७. सुत्केरी हुने मिति भन्दा कति समय पहिले नै स्वास्थ्य प्राविधिक अथवा महिला स्वास्थ्य स्वयंसेविकालाई खबर गर्नु पर्छ ?

- ◯ सुत्केरी हुने मिति भन्दा २ महिना पहिले
- ◯ सुत्केरी हुने मिति भन्दा १ महिना पहिले
- ◯ सुत्केरी हुने मिति भन्दा २ हप्ता पहिले
- ◯ सुत्केरी हुने मिति भन्दा १ हप्ता पहिले
- ◯ स्वास्थ्य प्राविधिक तथा महिला स्वास्थ्य स्वयंसेविकालाई खबर गर्नु आवश्यक छैन
- ◯ मलाई थाह छैन

५८. यदि कुनै परिवारको सदस्यले स्वास्थ्य संस्थामा सुत्केरी गराउने योजना भएमा, कति दिन पहिले नै यातायातको साधन तयार पर्नु पर्छ?

## सुरक्षित गर्भधारण र प्रसुतिः ज्ञान, व्यवहार र बानी सम्बन्धि सर्भे

- ◯ सुत्केरी हुने मिति भन्दा १ दिन पहिले
- ◯ सुत्केरी हुने मिति भन्दा ४ दिन पहिले
- ◯ सुत्केरी हुने मिति भन्दा १ हप्ता पहिले
- ◯ सुत्केरी हुने मिति भन्दा २ हप्ता पहिले
- ◯ आवश्यक छैन
- ◯ मलाई थाह छैन

५९. गर्भावस्था र सुत्केरी सम्बन्धि तपाई र तपाईको परिवारको अनुभव बारे अरु केहि थप्न चाहनुहुन्छ ?

**Appendix 3: Information statement for the participant – English**

Intervention and Control Clusters (Baseline / Post-intervention Surveys)



Chief Investigator: Prof Roger Smith
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Faculty of Health and Medicine
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The University of Newcastle
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Phone +61024014376
Fax +61024014394
Email roger.smith@newcastle.edu.au

**Research Project: Pathways to Improving Maternal Mortality in Rural Nepal**

Primary supervisor: Prof Roger Smith
Co-supervisor: A/Prof Deborah Loxton
Student researcher: Binod Bindu Sharma
School of Medicine and Public Health,
Faculty of Health and Medicine
The University of Newcastle, Australia

Please note that this information sheet will be translated in Nepalese language for distribution to the household in the study area. You are invited to participate in the research project identified above which is being conducted by Binod Bindu Sharma, a Ph.D. student from School of Medicine and Public Health, Faculty of Health and Medicine at the University of Newcastle, Australia. The research is part of Ph.D. studies supervised by Prof Roger Smith and Associate Prof Deborah Loxton from the School of Medicine and Public Health, Faculty of Health and Medicine at The University of Newcastle, Australia.

**Why is the research being done?**

The purpose of the research is to promote community awareness of the importance of antenatal care and delivery by skilled assistants using health songs developed by local students. Folk media have been found to be useful tools for creating behaviour change (Jinadasa, W.M.P.K., et al, 2011). Engagement of the community in developing health songs and singing sessions will establish a new approach to the communication of health messages and cultural transformation in the villages. Local students, teachers, community health workers, and mothers will take the leadership in the whole process of design, development and implementation of an awareness program. We believe this community-led process will create a substantial improvement in the level of knowledge and positive

attitude towards pregnancy and childbirth management issues within the community. Our project seeks to change maternal mortality from the grass roots level using health messages transmitted to the whole community using songs created within the community.

**Who can participate in the research?**
For the research, a senior male or a female from each household will be invited for the interview. We plan to have equal numbers of male and female respondents from the total households to be interviewed. Please note that you are ineligible to participate if you are not senior male or female of the family.

**What would you be asked to do?**

If you agree to participate, you will be invited to complete a survey/questionnaire about your knowledge, attitude and experience about care during pregnancy and childbirth. A numerator will ask you the questions and collect your answers using an iPad. You may be asked to do this survey twice over a period of time. Your responses will be uploaded to an online survey system.

**What choice do you have?**

Participation in this research is entirely your choice. Only those people who give their informed consent will be included in the project. Whether or not you decide to participate, your decision will not disadvantage you. If you do decide to participate, you may withdraw from the project at any time before submitting your completed survey. Please note that due to the anonymous nature of the survey, you will not be able to withdraw your response after it has been submitted.

**How much time will it take?**

The online survey should take about 30 – 40 minutes to complete.

**What are the risks and benefits of participating?**

There are no anticipated risks associated with participating in this research. Some of the questions deal with potentially sensitive issues. If you find any of the questions/issues upsetting you can stop your participation at any time. By participating in this questionnaire, you will have the opportunity to share your knowledge, attitude and experience about care during pregnancy and childbirth that may help improve the services offered by the government in the future.

**How will your privacy be protected?**

The collected data will be stored securely (on a password protected computer / in a locked filing cabinet) in the Chief Investigator's office. Data will be retained for a minimum of 5 years as per University of Newcastle requirements. Due to the anonymous nature of the survey/questionnaire the responses you provide will not be identifiable.

**How will the information collected be used?**

The collected data will contribute towards Binod's PhD thesis and may be presented in academic publications or conferences. Non-identifiable data may also be shared with

other parties to encourage scientific scrutiny and to contribute to further research and public knowledge, or as required by law. A summary of the results may be presented to the Government of Nepal with the hope that the recommendations will be adopted to improve the services available to pregnant women. Individual participants will not be named or identified in any reports arising from the project although anonymous individual responses may be quoted.

**What do you need to do to participate?**

Please read/listen this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or you have questions, please contact the researcher.

If you would like to participate, please inform us that you are happy to take part in the research, and it will be taken/ recorded as your implied consent to participate.

**Further information**

If you would like further information, please contact Binod Bindu Sharma (9856033932) or Secretary, Village Development Committee (contact details will be inserted) National Health Research Council, Nepal (Tel: 01-4227460) or Prof Roger Smith at The University of Newcastle, Australia. Tel: +61024014376,

Email: roger.smith@newcastle.edu.au

Thank you for considering this invitation.

| | |
|---|---|
| Signature _____ | Signature _____ |
| Prof Roger Smith | Binod Bindu Sharma |
| Chief Investigator | Student Researcher |

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2015-0451

**Complaints about this research**

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to Secretary, Village Development Committee. It is also possible to contact National Health Research Council. If an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.

Appendix 4: Information statement for participant - Nepali

**सहभागीको लागि सुचना तथा जानकारी**

**(Intervention and Control Clusters)**

**(Baseline / Post-intervention Surveys)**

Chief Investigator: Prof. Roger Smith
(प्रमुख सोधकर्ता: प्रा. रोगर स्मिथ)
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Faculty of Health and Medicine
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Email (ईमेल) roger.smith@newcastle.edu.au

## Research Project: Pathways to Improving Maternal Morality in Rural Nepal

## (रिसर्च प्रोजेक्ट: नेपालको ग्रामीण मातृ -मृत्युमा सुधार ल्याउने उपायहरु)

**Primary Supervisor**: Prof. Roger smith
**CO-supervisor**: A/Prof. Deborah Loxton
**Student researcher**: Binod Bindu Sharma
School of Medicine and public Health,
Faculty of Health and Medicine,

**प्रमुख निरीक्षक**: प्रा. रोजर स्मिथ
**साहायक निरीक्षक**: सा. प्रा. देवोरा लोक्सटन
**विधार्थी खोजकर्ता**: विनोद विन्दु शर्मा
स्कुल अफ मेडिसिन एण्ड पब्लिक हेल्थ
फ्याकल्टी अफ हेल्थ एण्ड मेडिसिन
न्युक्यासल विश्वविधालय, अष्ट्रेलिया

Document Version: 01 (०१);
Dated: (०१/०२/२०१६)

न्युक्यासल विश्वविधालय, अष्ट्रेलिया (The University of Newcastle, Australia) विधावारिधिका (P.H.D) विधार्थी विनोद विन्दु शर्माले संचालन गर्नुभयको यस रिसर्चमा (खोजमा) तपाईलाई सहभागीको

लागि आमन्त्रित गरिन्छ | यो रिसर्च (खोज) विधावारिधि अध्यापनको अंश हो | यसलाई न्युक्यासल विश्वविधालयका प्रा. रोजर स्मिथ (Prof. Roger Smith) र सा. प्रा. देवोरा लोक्सटनले (A/Prof. Deborah Loxton) निरिक्षण गर्नुभएको छ |

**यो रिसर्च (खोज) के का लागि गरिएको हो ?**

यस रिसर्चको मुख्य उद्देश्य समुदायमा गर्भावस्थामा स्वास्थ्य जाचँ तथा दक्ष प्राविधिकबाट सुत्केरी गराउनुको महत्वबारे स्थानिय विधार्थीहरुले विकास गरेको गीतको प्रयोग गरि जनचेतना जगाउनु हो | व्यवहार परिवर्तनक लागि स्थानिय संचारमाध्यमहरु (Local Media) को सहयोग कोसेढुंगा सावित हुनेछ | स्वास्थ्य गानको विकास र गाउने कार्यक्रमहरुको लागि समुदायको सहभागिताले नयाँ आयाम थप्नेछन् | जनचेतना जगाउने कार्यक्रमको विकास, प्रवर्दन र कार्यान्वयनका लागि स्थानिय विधार्थी, शिक्षक, सामाजिक स्वास्थ्यकर्मी र आमाहरुले नेतृत्वदायी भूमीका निर्वाह गर्नेछन् | हामीलाई विश्वास छ समाजले नै नेतृत्व गरेको यस प्रक्रियाले गर्भावस्था र सुत्केरीको व्यवस्थापन सम्बन्धित विषयवस्तु प्रति समाजको मूल्य मान्यतालाई दिगो विकास गरि अग्रदिशा तर्फ लग्नेछ | यस कार्यले समाजमा निर्माण गरिएको गीतको प्रयोगबाट मातृ –मृत्युलाई जरै देखि नै निर्मुल गर्नेछ |

**यस रिसर्चमा को सहभागी हुनसक्छन् ?**

यस रिसर्चको लागि प्रत्येक परिवारबाट जेष्ठ महिला तथा पुरुष लाई सहभागिताको लागि अनुरोध गरिने छ | हाम्रो योजना अनुसार कुल परिवार मध्येबाट महिला तथा पुरुष सहभागिता बराबरी गराउने छौं |
कृपया याद राख्नुहोस्, यदी तपाई परिवारको जेष्ठ महिला तथा पुरुष हुनुहुन्न भने तपाई सहभागिताका लागि अयोग्य हुनुहुन्छ |

**तपाईलाई के गर्न लगाईन सक्छ ?**

तपाई सहभागिताको लागि मन्जुर भएमा, तपाईलाई गर्भवती, प्रसुती र सुत्केरी अवास्था सम्बन्धि तपाईको ज्ञान, व्यवहार र बानि सम्बन्धि जानकारी को लागि यस सर्भे तथा प्रश्न-उत्तरको लागि आमन्त्रित गरिने छ | हाम्रा सहयोगीले तपाई लाई प्रश्न सोध्ने छन् र तपाईले दिएको जानकारी ipad / laptop (कम्प्युटर) मार्फत online सर्भे व्यवस्थामा संग्रहित गरिने छ |

**तपाईसँग के के विकल्प छन् ?**

यो रिसर्चमा सहभागिता जनाउनु तपाईको आफ्नै निर्णय हो | जुन व्यक्तिले यस प्रोजेक्टको प्रक्रियामा सहभागिता जनाउन मन्जुरी दिनुहुन्छ, उहाँहरुलाई नै सहभागी गराइने छ | सहभागिता जनाउने अथवा नजनाउने निर्णय तपाईकै  हो; यसले तपाईलाई कुनै बेफाईदा गर्ने छैन | यदि तपाई सहभागी हुनुभयो र तपाईले जानकरी तथा सूचना नबुझाऊदै (Before summit) फिर्ता गर्न चाहेमा, फिर्ता गर्न सक्नुहुन्छ | कृपया याद राख्नुहोस् प्रोजेक्टको आफ्नै प्रकृतिले गर्दा, उत्तर तथा जानकारी बुझाईसकेपछी (after summiting) फिर्ता गर्न सकिने छैन् |

**यसले कति समय लिनेछ ?**

यस online सर्भेको लागि ३०-४० मिनेट (Minutes) लाग्नेछ | यस प्रक्रियामा सहभागिता जनाउँदा कुनै खतरा तथा हानी हुने छैन | केहि प्रश्नहरु संबेदनशील विषय सम्बन्धित छन्, यदि तपाईलाई कुनै प्रश्न तथा विषयवस्तुले असर तथा चिन्तित् बनाएमा कुनै पनि बेला तपाईको सहभागिता फिर्ता गर्न सक्नुहुन्छ | यस रिसर्चमा सहभागी भएर तपाईले गर्भवती, प्रसुती र सुत्केरी अवास्था सम्बन्धि तपाईको ज्ञान, व्यवहार र बानि सम्बन्धि अनुभव साटी स्वास्थ्य सुचनाको विकास र भविष्यमा सरकारले गर्भवती महिलालाई प्रदान गर्ने स्वास्थ्य सेवा तथा सुविधा सुधारको लागि महत्वपूर्ण अवसर प्राप्त गर्नुहुनेछ |

**तपाईको गोपनीयता कसरी सुरक्षित राखिने छ ?**

संकलित सूचनाहरु सुरक्षित साथ (password protected computer) प्रमुख सोधकर्ता (Prof. Roger Smith) को अफिसमा राखिनेछ | संकलित सुचनाहरु विश्वविधालयको आवश्यकता अनुसार कम्तिमा पनि ५ बर्ष सुरक्षित साथ राखिनेछ | यस सर्भेको प्रकृतिले गर्दा सहभागी कसले के जानकारी तथा उत्तर दिएको हो भनि छुटाउन सकिदैन् | व्यक्तिगत सूचना र पहिचाहरु गोप्य राखिनेछन् |

**संकलित सुचनाहरु कसरि प्रयोग गरिने छ ?**

Intervention प्रक्रिया सकिए पछी, संकलित सूचनाहरु विनोदको थेसिसमा (thesis) प्रयोग गरिनेछ र त्यो विभिन्न शैक्षिक प्रकासन, सभा समाहरोमा प्रस्तुति गरिनेछ | सरकारको नीति नियम सुधारको आशाका साथ नतिजाको सारांश नेपाल सरकारलाई समेत बुझाइने छ | व्यक्तिगत सूचना र पहिचाहरु गोप्य राखिनेछन् |

**सहभागि हुन को लागि के गर्नु आवश्यक छ ?**

कृपया यस सर्भे मा भाग लिनु भन्दा पहिले सूचना तथा जानकरी पत्र राम्रोसँग पढेर / सुनेर, सबै जानकारी राम्रो सगँ बुझी मात्र सहभागिता जनाउनुहोस् | यदि तपाईसँग कुनै गुनासो तथा प्रश्न सम्बन्धी थप जानकारी लिने इच्छा छ भने खोजकर्ता (विनोद विन्दु शर्मा) लाई सम्पर्क गर्नुहोला |

**अन्य जानकारीको लागि:**

तपाई यस प्रोजेक्ट सम्बन्धि थप केही जानकारी लिन चाहनुहुन्छ भने, कृपया तल उल्लेखित ठेगानामा सम्पर्क गर्नु होला |

विनोद विन्दु शर्मा: ९८५६०३३९३२

गा.वि.स. सचिव:

राष्ट्रिय स्वास्थ्य अनुसन्धान केन्द्र, नेपाल फोन नं, ०१-४२२७४६०

प्रा. रोजर स्मिथ: +६१०२४०१४३७६, Email: (roger.smith@newcastle.edu.au)

तपाईको सहयोगको लागि धन्यवाद |

| | |
|---|---|
| ..... | ..... |
| प्रा. रोजर स्मिथ | विनोद विन्दु शर्मा |
| प्रमुख सोधकर्ता | विद्यार्थी खोजकर्ता |

यो प्रोजेक्ट विश्वविधालयको Human Research Ethics समितिबाट मान्यता प्राप्त छ, Approved No: H-2015-0451

**उजुरीका लागी:**

रिसर्चको प्रक्रियामा गरिएका व्यवहार या कुनै अधिकार हनन् का घटना भएमा निम्न ठेगानामा उजुरी गर्न सक्नु हुनेछ |

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२. गा.वि. स सचिव:

३.राष्ट्रिय स्वास्थ्य अनुसन्धान केन्द्र, नेपाल फोन नं. ०१-४२२७४६०

**Appendix 5: Information statement for schools of intervention cluster - English**



Chief Investigator: Prof Roger Smith
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Faculty of Health and Medicine
Hunter Medical Research Institute
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**Research Project: Pathways to Improving Maternal Mortality in Rural Nepal**

Primary supervisor: Prof Roger Smith
Co-supervisor: A/Prof Deborah Loxton
Student researcher: Binod Bindu Sharma
School of Medicine and Public Health,
Faculty of Health and Medicine,
The University of Newcastle, Australia

Document Version: 02; dated: 1/03/2016

Your school community is invited to participate in the research project identified above which is being conducted by Binod Bindu Sharma, a Ph.D. student at The University of Newcastle, Australia. The research is part of Ph.D. studies, supervised by Prof Roger Smith and Associate Prof Deborah Loxton from the School of Medicine and Public Health, Faculty of Health and Medicine at The University of Newcastle, Australia.

**Why is the research being done?**

The purpose of the research is to promote community awareness of the importance of antenatal care and delivery by skilled assistants using health songs developed by local students. This will involve a song competition to determine the best songs to achieve community outcomes. Folk media have been found to be useful tools for creating behaviour change (Jinadasa, W.M.P.K., et al, 2011). Engagement of the community in developing health songs and singing sessions will establish a new approach to the communication of health messages and cultural transformation in the villages. Local students, teachers, community health workers, and mothers will take the leadership in the whole process of design, development and implementation of an awareness program. We believe this community-led process will create a substantial improvement in the level of knowledge and positive attitude towards pregnancy and childbirth management issues

within the community. Our project seeks to change maternal mortality from the grass roots level using health messages transmitted to the whole community using songs created within the community.

**Anticipated results**

Upon completion of the research and intervention in the intervention Village Development Committees, following outcomes are expected to achieve in shorter and long-term time frame.

1. Pregnant women and family members, including mothers-in-law and fathers-in-law, recognize the potential risks of pregnancy
2. Improved awareness and care during pregnancy and childbirth
3. Improved family responsiveness to care during pregnancy and childbirth
4. Number of antenatal visits increased
5. Complicated pregnancies diagnosed and managed in time
6. Reduction in the number of delivery complications
7. Improved pregnancy outcomes
8. A model of community awareness involving the leadership of local students and mothers instituted
9. Sustained community awareness of the need for improved maternal health outcomes

**Who can participate in the research?**

The high / higher secondary schools of intervention area (Ramja Deurali and Chitre Village Development Committee) are invited to participate in the process of developing health songs and imparting health messages in the villages. Please note that you are ineligible to participate if you are not a high /higher secondary school of intervention communities.

**What would you be asked to do?**

Your school is being invited to play important roles in the processes of intervention as following;

1. Facilitate students to engage in the development of health songs using the guidelines provided to you (see attached key concept areas).
2. Encourage and facilitate the community and students to join to develop health songs.
3. Offer cooperation and support during the organization of inter-school competition.

4. Facilitate the process of recording songs in the voice of students and local people.
5. Cooperate and support during the singing health songs in the villages.
6. Help coordinate the smooth flow of information in the communities.

**What choice do you have?**

Participation in this research is entirely your choice. Only those schools who give their informed consent will be included in the intervention project. Whether or not you decide to participate, your decision will not disadvantage you.

**How much time will it take?**

The intervention activities should take about 6 – 7 months to complete.

**What are the risks and benefits of participating?**

There are no anticipated risks associated with participating in this intervention research. By taking part in this research, your school community will have the opportunity to develop health messages and impart in the villages through singing intervention.

**How will the information collected be used?**

After the intervention, the data collected will contribute towards Binod's Ph.D. thesis and may be presented in academic publications or conferences. Non-identifiable data may also be shared with other parties to encourage scientific scrutiny and to contribute to further research and public knowledge, or as required by law. A summary of the results will be submitted to the Government of Nepal after completion of the study. Individual participants will not be named or identified in any reports arising from the project although anonymous individual responses may be quoted.

**Flow of the activities**


**Further information**

If you would like further information, please contact Binod Bindu Sharma (9856033932) or Secretary, Village Development Committee (contact details will be inserted) National Health Research Council, Nepal (Tel: 01-4227460) or Prof Roger Smith at The University of Newcastle, Australia. Tel: +61024014376,

Email: roger.smith@newcastle.edu.au

Thank you for considering this invitation.

| | |
|---|---|
| Signature _____ | Signature _____ |
| Prof Roger Smith | Binod Bindu Sharma |
| Chief Investigator | Student Researcher |

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2015-0451

**Complaints about this research**

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to Secretary, Village Development Committee. It is also possible to contact National Health Research Council. If an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.

**Appendix 6: Information statement for schools of intervention cluster - Nepali**

**विधालयको लागि सुचना तथा जानकारी पत्र**
**(Intervention cluster)**

Chief Investigator: Prof. Roger Smith
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Faculty of Health and Medicine
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## Research Project: Pathways to Improving Maternal Morality in Rural Nepal
## (रिसर्च प्रोजेक्ट: नेपालको ग्रामीण मातृ -मृत्युमा सुधार ल्याउने उपायहरु)

**Primary Supervisor**: Prof Roger smith
**CO-supervisor**: A/Prof Deborah Loxton
**Student researcher**: Binod Bindu Sharma
School of Medicine and public Health,
Faculty of Health and Medicine,
The University of Newcastle, Australia
Document Version: 01; Dated: 01/02/2016

**प्रमुख निरीक्षक**: प्रा. रोजर स्मिथ
**साहायक निरीक्षक**: सा. प्रा. देवोरा लोक्सटन
**विधार्थी खोजकर्ता**: विनोद विन्दु शर्मा
स्कुल अफ मेडिसिन एण्ड पब्लिक हेल्थ
फ्याकल्टी अफ हेल्थ एण्ड मेडिसिन
न्युक्यासल विश्वविधालय, अष्ट्रेलिया
Document Version: 01 (०१);
Dated: 01/02/2016 (०१/०२/२०१६)

न्युक्यासल विश्वविधालय, अष्ट्रेलिया (The University Of Newcastle, Australia) विधावारिधिका (P.H.D) विधार्थी विनोद विन्दु शर्माले संचालन गर्नुभएको यस रिसर्चमा (खोजमा) तपाईको विधालयलाई सहभागीको लागि आमन्त्रित गरिन्छ | यो रिसर्च (खोज) विधावारिधि अध्यापनको अंश हो | यसलाई न्युक्यासल विश्वविधालयका प्रा. रोजर स्मिथ (Prof. Roger Smith) र सा. प्रा. देवोरा लोक्सटनले (A/Prof Deborah Loxton) निरिक्षण गर्नुभएको छ |

**यो रिसर्च (खोज) के का लागि गरिएको हो ?**

यस रिसर्चको मुख्य उद्देश्य समुदायमा गर्भावस्थामा स्वास्थ्य जाचँ तथा दक्ष प्राविधिकबाट सुत्केरी गराउनुको महत्वबारे स्थानिय विधार्थीहरुले विकास गरेको गीतको प्रयोग गरि जनचेतना जगाउनु हो | व्यवहार परिवर्तनक लागि स्थानिय संचारमाध्यमहरु (Local Media) को सहयोग कोसेढुंगा सावित हुनेछ | स्वास्थ्य गानको विकास र गाऊने कार्यक्रमहरुको लागि समुदायको सहभागिताले नयाँ आयाम थप्नेछन् | जनचेतना जगाउने कार्यक्रमको विकास, प्रवर्द्धन र कार्यान्वयनका लागि स्थानिय विधार्थी, शिक्षक, सामाजिक स्वास्थ्यकर्मी र आमाहरुले नेतृत्वदायी भूमीका निर्वाह गर्नेछन् | हामीलाई विश्वास छ समाजले नै नेतृत्व गरेको यस प्रक्रियाले गर्भावस्था र सुत्केरीको व्यवस्थापन सम्बन्धित विषयवस्तु प्रति समाजको मूल्य मान्यतालाई दिगो विकास गरि अग्रदिशा तर्फ लग्नेछ | यस कार्यले समाजमा निर्माण गरिएको गीतको प्रयोगबाट मातृ –मृत्युलाई जरै देखि नै निर्मुल गर्नेछ |

**आशा गरीएका नतिजाहरु**

यस रिसर्च सकिए पछी छोटो या लामो अवधि भित्र निम्न नातिजाहरुको अपेक्षा गरिएको छ |

१. गर्भवती महिला, उनका सासु-ससुरा र परिवारका अन्य सदस्यहरुद्धारा गर्भावस्थाका जोखिमहरुको पहिचान
२. गर्भावस्था र सुत्केरी अवस्थाका बारे जनचेतना र हेरचाहमा सुधार
३. गर्भावस्था र सुत्केरी अवस्थामा हेरचाहका लागि परिवारको जिम्मेवारी बहनमा वृद्धि
४. गर्भावस्थामा स्वास्थ्य जाचँ गराउने क्रममा वृद्धि
५. गर्भावस्थाका जटिलताको समयमै पहिचान र निधान
६. सुत्केरी गराउँदाका जटिलताहरुमा कमी
७. सुत्केरी पछिका नातिजाहरुमा सुधार
८. स्थानीय विधयार्थीहरु र आमा समूहको नेतृत्वमा गरिने जनचेतना मुलक कार्यक्रमको नमुना
९. मातृ स्वास्थ्य सुधारको आवश्यकतामा समुदायको दिगो जनचेतना विकास

**यस रिसर्चमा कसले सहभागिता हुनसक्छन् ?**

स्वास्थ्य गानको विकास र स्वास्थ्य सूचना प्रवाहमा राम्जा देउराली र चित्रे गा.वि.स. का माध्यामिक तथा उच्चा माध्यमिक विधालयहरु सहभागी हुनसक्नेछन् | याद राख्नुहोस् यदि तपाई चित्रे र राम्जा देउरली गा.वि.स. का माध्यामिक तथा उच्चा माध्यमिक विधालयबाट हुनुहुन्न भने तपाई सहभागिताका लागि अयोग्य हुनुहुन्छ |

**तपाईलाई के गर्न लगाईन सक्छ ?**

तपाईको विधालय interventation प्रक्रियामा सहभागिताका लागि निम्न तरिकाले निमन्त्रित गरिन सक्छ |

१. तपाईलाई प्राप्त निर्देशन अनुसार स्वास्थ्य गान विकासको लागि विधार्थीहरुलाई उत्साहित गर्ने (संलग्न कागजात हेर्नुहोला)
२. स्वास्थ्य गान विकासको लागि समुदाय र विधार्थीलाई संलग्न गराउन प्रोत्साहन र सहयोग गर्ने
३. अन्तर विधालय प्रतिस्पर्धामा सहयोग र सहकार्य गर्ने

४. स्थानीयवासी र विधार्थीहरुको आवाजमा गीत रेकर्ड (record) गर्ने प्रक्रियामा सहयोग गर्ने
५. गाऊँमा स्वास्थ्य गान गाउन सहयोग र सहकार्य गर्ने
६. समुदायमा सूचना प्रवाहका लागि सहकार्य गर्ने

**तपाईसँग के के विकल्प छन् ?**

यो रिसर्चमा सहभागिता जनाउनु तपाईको आफ्नै निर्णय हो | जुन विधालयले intervention प्रक्रियामा सहभागिता जनाउन मौखिक मन्जुरी दिनुहुन्छ, उहाँहरुलाई नै सहभागी गराइने छ | सहभागिता जनाउने अथवा नजनाउने निर्णय तपाईकै हो; यसले तपाईलाई कुनै बेफाईदा गर्ने छैन |

**यसले कति समय लिनेछ ?**

Intervention प्रक्रियाका लागि ६-७ महिना लाग्नेछ | यस प्रक्रियामा सहभागिता जनाउँदा कुनै खतरा तथा हानी हुने छैन | यस रिसर्चमा सहभागी भएर तपाईले गीतका माध्यमबाट स्वास्थ्य सुचनाको विकास र त्यसबाट समुदायमा सकारात्मक प्रभाव प्रवाह गर्ने अवसर प्राप्त गर्नुहुनेछ |

**संकलित सुचनाहरु कसरि प्रयोग गरिने छ ?**

Intervention प्रक्रिया सकिए पछी, संकलित सूचना (तथ्याङ्क) हरु विनोदको थेसिसमा (thesis) प्रयोग गरिनेछ र त्यो विभिन्न शैक्षिक प्रकासन र सभा समाहरोमा प्रस्तुति गरिनेछ | साथै सरकारको नीति नियम सुधारको लागि, नतिजाको सारांश नेपाल सरकारलाई बुझाइने छ | व्यक्तिगत सूचना र पहिचाहरु गोप्य राखिनेछन् |

**प्रक्रियाहरु**

**अन्य जानकारीको लागि:**

तपाई यस प्रोजेक्ट सम्बन्धि थप केही जानकारी लिन चाहनुहुन्छ भने, कृपया तल उल्लेखित ठेगानामा सम्पर्क गर्नु होला |

विनोद विन्दु शर्मा: ९८५६०३३९३२

गा.वि.स. सचिव:

राष्ट्रिय स्वास्थ्य अनुसन्धान केन्द्र, नेपाल फोन नं, ०१-४२२७४६०

प्रा. रोजर स्मिथ: +६१०२४०१४३७६, Email: (roger.smith@newcastle.edu.au)

तपाईको सहयोगको लागि धन्यवाद |

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|---|---|
| ..... | ..... |
| प्रा. रोजर स्मिथ | विनोद विन्दु शर्मा |
| प्रमुख सोधकर्ता | विधार्थी खोजकर्ता |

यो प्रोजेक्ट विश्वविधालयको Human Research Ethics समितिबाट मान्यता प्राप्त छ, Approved No: H-2015-0451

**उजुरीका लागी:**

रिसर्चको प्रक्रियामा गरिएका व्यवहार या कुनै अधिकार हनन् का घटना भएमा निम्न ठेगानामा उजुरी गर्न सक्नु हुनेछ |

२. Human Research Ethics Officer, Research office
The chancellery, The University of Newcastle
University Drive, Callaghan NSW 2308, Australia
Tel no: (02) 49216333
Email: Human-Ethics@newcastle.edu.au.

२. गा.वि. स. सचिव:

३.राष्ट्रिय स्वास्थ्य अनुसन्धान केन्द्र, नेपाल फोन नं. ०१-४२२७४६०

**Appendix 7: Information statement for Village Development Committees - English**

Chief Investigator: Prof Roger Smith
School of Medicine and Public Health
Faculty of Health and Medicine
Hunter Medical Research Institute
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**Research Project: Pathways to Improving Maternal Mortality in Rural Nepal**

Primary supervisor: Prof Roger Smith
Co-supervisor: A/Prof Deborah Loxton
Student researcher: Binod Bindu Sharma
School of Medicine and Public Health,
Faculty of Health and Medicine,
The University of Newcastle, Australia

Document Version: 01; dated 01/02/2016

You are invited to participate in the research project identified above which is being conducted by Binod Bindu Sharma, a Ph.D. student at The University of Newcastle, Australia. The research is part of Ph.D. studies, supervised by Prof Roger Smith and Associate Prof Deborah Loxton from the School of Medicine and Public Health, Faculty of Health and Medicine at The University of Newcastle, Australia.

**Purpose**

The purpose of the research is to promote community awareness of the importance of antenatal care and delivery by skilled assistants using health songs in the traditional folk genre developed by local students. This will involve a song competition to determine the best songs to achieve community outcomes. Folk media have been found to be useful tools for creating behaviour change (Jinadasa, W.M.P.K., et al, 2011). Engagement of the community in developing health songs and singing sessions will establish a new approach to the communication of health messages and cultural transformation in the villages. Local students, teachers, community health workers, and mothers will take the leadership in the whole process of design, development and implementation of an awareness program. We believe this community-led process will create a substantial improvement in the level of knowledge and positive attitude towards pregnancy and childbirth management issues within the community. Our project seeks to change maternal mortality from the grass roots level using health messages transmitted to the whole community using songs created within the community.

Before and after the intervention, the data collected will contribute towards Binod's Ph.D. thesis and may be presented in academic publications or conferences. Non-identifiable data may also be shared with other parties to encourage scientific scrutiny and to contribute to further research and public knowledge, or as required by law. A summary of the results will be submitted to the Government of Nepal after completion of the study. Individual participants will not be named or identified in any reports arising from the project although anonymous individual responses may be quoted.

**Anticipated results**

Upon completion of the research and intervention in the intervention Village Development Committees, following outcomes are expected to achieve in shorter and long-term time frame.

1. Pregnant women and family members, including mothers-in-law and fathers-in-law, recognize the potential risks of pregnancy
2. Improved awareness and care during pregnancy and childbirth
3. Improved family responsiveness to care during pregnancy and childbirth
4. Number of antenatal visits increased
5. Complicated pregnancies diagnosed and managed in time
6. Reduction in the number of delivery complications
7. Improved pregnancy outcomes
8. A model of community awareness involving the leadership of local students and mothers instituted
9. Sustained community awareness of the need for improved maternal health outcomes

**Participation**

All the households of intervention (Ramja and Chitre) and control (Mudikuwa and Falebas Khanigaun) area will participate in online (baseline and post-intervention survey). The high / higher secondary schools of intervention area (Ramja Deurali and Chitre Village Development Committees) will be involved in the process of developing health songs and imparting health messages in the villages.

**What are the risks and benefit of participating?**

You are requested/invited to take part in the course of this intervention research in your Village Development Committee. Your coordinating role (in the intervention villages) will help benefit respective students, teachers, mother's group members, health workers and community health volunteers to be engaged in developing health songs, participate in song competition and the implementation of the singing sessions in the community. This intervention will help community people to be responsive to ensure safer pregnancy and childbirth.

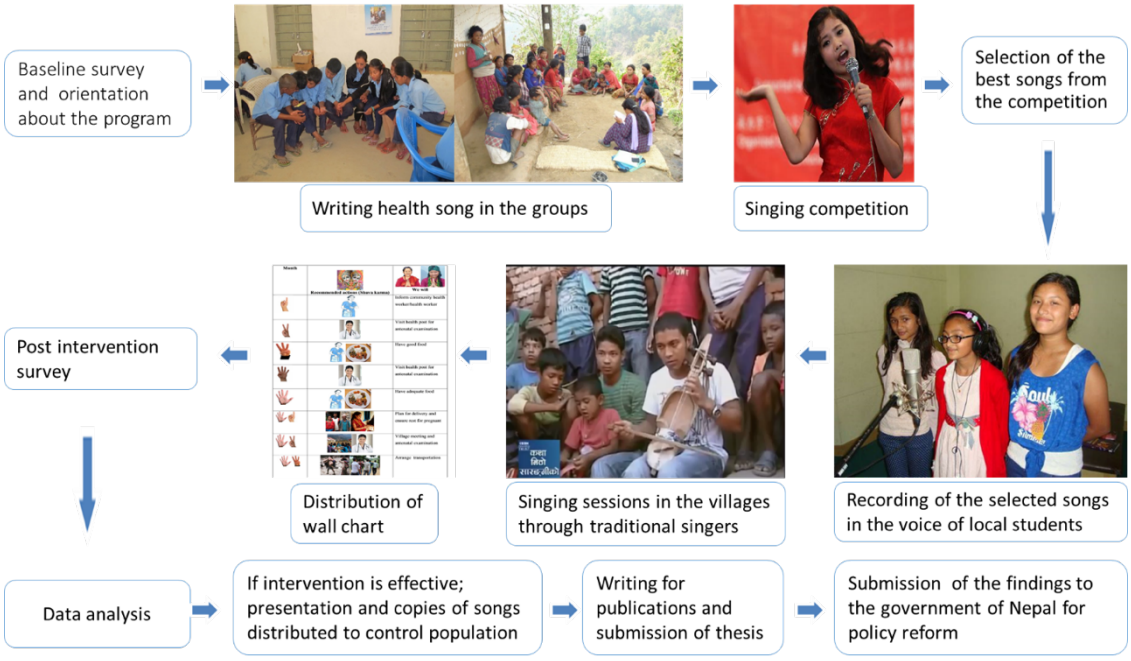
You are requested/expected to play important roles in the processes of survey and intervention as following;

1. Facilitate community people to participate in taking part in the surveys (intervention and control VDCs)
2. Facilitate students to engage in the development of health songs (intervention VDCs).
3. Encouraging and facilitating community people and students to effort together to develop songs (intervention VDCs).
4. Coordinate and support during the organization of inter-school competition (intervention VDCs).
5. Facilitate the process of recording songs in the voice of students and local people (intervention VDCs).

6. Coordinate and support while singing health sons in the villages (intervention VDCs).
7. Help coordinate the smooth flow of information in the communities and respective stakeholders (intervention and control VDCs).

**Flow of the activities**

Baseline and post-intervention surveys will be organized in control Village Development Committees. Intervention program will be arranged in intervention Village Development **Committees as following.**




**Time**

The intervention research project should take about 8 –12 months to complete.

There are no anticipated risks associated with participating in thisresearch/intervention. By taking part in this research, your Village Development Committee will have the opportunity to provide the information about the knowledge, attitude and experience about care during pregnancy and childbirth and develop health messages and impart in the villages through singing intervention.

**Further information**

If you would like further information, please contact Binod Bindu Sharma (9856033932) or Secretary, Village Development Committee (contact details will be inserted) National Health Research Council, Nepal (Tel: 01-4227460) or Prof Roger Smith at The University of Newcastle, Australia. Tel: +61024014376,

Email: roger.smith@newcastle.edu.au

Thank you for considering this invitation.

Signature _____ Signature_____

| | |
|---|---|
| Prof Roger Smith | Binod Bindu Sharma |
| Chief Investigator | Student Researcher |

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2015-0451

**Complaints about this research**

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to Secretary, Village Development Committee. It is also possible to contact National Health Research Council. If an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.

Appendix 8: Information statement for Village Development Committees - Nepali

**गाऊँ विकास समिति (गा.वि.स.) को लागि सूचना तथा जानकारी पत्र**
**(For Intervention and Control Clusters)**

Chief Investigator: Prof. Roger Smith
(प्रमुख सोधकर्ता: प्रा. रोगर स्मिथ)
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## Research Project: Pathways to Improving Maternal Morality in Rural Nepal
## (रिसर्च प्रोजेक्ट: नेपालको ग्रामीण मातृ -मृत्युमा सुधार ल्याउने उपायहरु)

**Primary Supervisor**: Prof Roger smith
**CO-supervisor**: A/Prof Deborah Loxton
**Student researcher**: Binod Bindu Sharma
School of Medicine and public Health,
Faculty of Health and Medicine,
The University of Newcastle, Australia

Document Version: 01;
Dated: 01/02/2016

**प्रमुख निरीक्षक**: प्रा. रोजर स्मिथ
**साहायक निरीक्षक**: सा. प्रा. देवोरा लोक्सटन
**विधार्थी खोजकर्ता**: विनोद विन्दु शर्मा
स्कुल अफ मेडिसिन एण्ड पब्लिक हेल्थ
फ्याकल्टी अफ हेल्थ एण्ड मेडिसिन
न्युक्यासल विश्वविध्यालय, अष्ट्रेलिया

Document Version: 01 (०१);
Dated: 01/02/2016 (०१/०२/२०१६)

लागि आमन्त्रित गरिन्छ | यो रिसर्च (खोज) विधावारिधि अध्यापनको अंश हो | यसलाई न्युक्यासल

विश्वविधालयका प्रा. रोजर स्मिथ (Prof. Roger Smith) र सा. प्रा. देवोरा लोक्सटनले(A/Prof Deborah Loxton) निरिक्षण गर्नुभएको छ |

**रिसर्च का उद्देश्यहरु:**

यस रिसर्चको मुख्य उद्देश्य समुदायमा गर्भावस्थामा स्वास्थ्य जाचँ तथा दक्ष प्राविधिकबाट सुत्केरी गराउनुको महत्वबारे स्थानिय विधार्थीहरुले विकास गरेको गीतको प्रयोग गरि जनचेतना जगाउनु हो | व्यवहार परिवर्तनक लागि स्थानिय संचारमाध्यमहरु (Local Media) को सहयोग कोसेढुंगा सावित हुनेछ | स्वास्थ्य गानको विकास र गाऊने कार्यक्रमहरुको लागि समुदायको सहभागिताले नयाँ आयाम थप्नेछन् | जनचेतना जगाउने कार्यक्रमको विकास, प्रवर्द्धन र कार्यान्वयनका लागि स्थानिय विधार्थी, शिक्षक, सामाजिक स्वास्थ्यकर्मी र आमाहरुले नेतृत्वदायी भूमीका निर्वाह गर्नेछन् | हामीलाई विश्वास छ समाजले नै नेतृत्व गरेको यस प्रक्रियाले गर्भावस्था र सुत्केरीको व्यवस्थापन सम्बन्धित विषयवस्तु प्रति समाजको मूल्य मान्यतालाई दिगो विकास गरि अग्रदिशा तर्फ लग्नेछ | यस कार्यले समाजमा निर्माण गरिएको गीतको प्रयोगबाट मातृ –मृत्युलाई जरै देखि नै निर्मुल गर्नेछ |

Intervention प्रक्रिया सकिए पछी, संकलित सुचनाहरु विनोदको थेसिसमा (thesis) प्रयोग गरिनेछ र त्यो विभिन्न शैक्षिक प्रकाशन र सभा-समाहरोमा प्रस्तुति गरिनेछ | सरकारको नीति नियम सुधारको लागि नतिजाको सारांश नेपाल सरकारलाई बुझाइने छ | व्यक्तिगत सूचना र पहिचाहरु गोप्य राखिनेछन् |

**आशा गरीएका नतिजाहरु**

यस रिसर्च सकिएपछी छोटो या लामो अवधि भित्र निम्न नातिजाहरुको आपेक्षा गरियको छ |

१. गर्भवती महिला, उनका सासु-ससुरा र परिवारका अन्य सदस्यद्धारा गर्भावस्थाका जोखिमहरुको पहिचान
२. गर्भावस्था र सुत्केरी अवस्थाका बारे जनचेतना र हेरचाहमा सुधार
३. गर्भावस्था र सुत्केरी अवस्थामा हेरचाहका लागि परिवारको जिम्मेवारी बहनमा वृद्धि
४. गर्भावस्थामा स्वास्थ्य जाचँ गराउने क्रममा वृद्धि
५. गर्भावस्थाका जटिलताको समयमै पहिचान र निधान
६. सुत्केरी गराउँदाका जटिलताहरुमा कमी
७. सुत्केरी पछिका नातिजाहरुमा सुधार
८. स्थानीय विधयार्थीहरु र आमा समूहको नेतृत्वमा गरिने जनचेतना मुलक कार्यक्रमको नमुना
९. मातृ स्वास्थ्य सुधारको आवश्यकतामा समुदायको दिगो जनचेतना विकास

**सहभागिता:**

राम्जा र चित्रेका सबै घर परिवारहरु intervention र फलेवासका सबै घर परिवारहरु control सर्भेको लागि online (baseline and post- intervention survey) सर्भेमा सहभागी हुने छन् | स्वास्थ्य गानको विकास र स्वास्थ्य सूचना प्रवाहमा राम्जा देउराली र चित्रे गा.वि.स. का माध्यामिक तथा उच्चा माध्यमिक विधालयहरुलाई सहभागी गराईने छ|

**सहभागिताका फाईदा र बेफाईदाहरु**

तपाईको गा.वि.स मा संचालन गरिएको intervention research प्रक्रियामा तपाईको सहभागिताको लागि अनुरोध गर्दछौँ | तपाईको नेतृत्वदायी भूमिकाले विधार्थी, शिक्षक, आमा समूह, स्वास्थ्य प्राविधिक र स्वास्थ्य स्वंसेविकालाई स्वास्थ्य सम्बन्धि गीत विकास र समुदायमा कार्यान्यनको लागि सहयोग पुग्नेछ | यस Intervention Research प्रक्रियाले समुदायमा सुरक्षित गर्भधारण र सुत्केरीको लागि महत्वपूर्ण भूमिका निर्वाह गर्नेछ |

तपाईलाई यस सर्भे र intervention research प्रक्रियामा तल उल्लेखित भूमिका निर्वाह गरिदिनको लागि विनम्र अनुरोध गर्दछौं |

१. स्थानीयवासीलाई सर्भेमा सहभागिताको लागि सहयोग गर्ने (चित्रे, राम्जा देउराली, मुडिकुवा र फलेवास गा.वि.स )
२. स्वास्थ्य गान विकासको लागि विधार्थीहरुलाई उत्साहित गर्ने (चित्रे र राम्जा देउराली गा.वि.स)
३. स्वास्थ्य गान विकासको लागि समुदाय र विधार्थीलाई संलग्न गराउन प्रोत्साहन र सहयोग गर्ने (चित्रे र राम्जा देउराली गा.वि.स )
४. अन्तर विधालय प्रतिस्पर्धामा सहयोग र सहकार्य गर्ने (चित्रे र राम्जा देउराली गा.वि.स )
५. स्थानीयवासी र विधार्थीहरुको आवाजमा गीत रेकर्ड (record) गर्ने प्रक्रियामा सहयोग गर्ने (चित्रे र राम्जा देउराली गा.वि.स )
६. गाउँमा स्वास्थ्य गान गाउन सहयोग र सहकार्य गर्ने (चित्रे र राम्जा देउराली गा.वि.स )
७. समुदायमा सूचना प्रवाहका लागि सहकार्य गर्ने (चित्रे, राम्जा देउराली, मुडिकुवा र फलेवास गा.वि.स )

**प्रक्रियाहरु:**


**समय:**

Intervention research प्रक्रियाका लागि ६-७ महिना लाग्नेछ | यस प्रक्रियामा सहभागिता जनाउँदा कुनै खतरा तथा हानी हुने छैन् | यस रिसर्चमा सहभागी भएर तपाईले गीतका माध्यमबाट स्वास्थ्य सुचनाको विकास र त्यसबाट समुदायमा सकारात्मक प्रभाव प्रवाह गर्ने अवसर प्राप्त गर्नुहुनेछ |

**अन्य जानकारीको लागि :**

तपाई यस प्रोजेक्ट सम्बन्धि थप केही जानकारी लिन चाहनुहुन्छ भने, कृपया तल उल्लेखित ठेगानामा सम्पर्क गर्नु होला |

विनोद विन्दु शर्मा: ९८५६०३३९३२

गा.वि.स. सचिव:

राष्ट्रिय स्वास्थ्य अनुसन्धान केन्द्र, नेपाल फोन नं, ०१-४२२७४६०

प्रा. रोजर स्मिथ: +६१०२४०१४३७६, Email: (roger.smith@newcastle.edu.au)

तपाईको सहयोगको लागि धन्यवाद |

| | |
|---|---|
| ..... | ..... |
| प्रा. रोजर स्मिथ | विनोद विन्दु शर्मा |
| प्रमुख सोधकर्ता | विद्यार्थी खोजकर्ता |

यो प्रोजेक्ट विश्वविधालयको Human Research Ethics समितिबाट मान्यता प्राप्त छ, Approved No: H-2015-0451

**उजुरीका लागी:**

रिसर्चको प्रक्रियामा गरिएका व्यवहार या कुनै अधिकार हनन् का घटना भएमा निम्न ठेगानामा उजुरी गर्न सक्नु हुनेछ |

१. Human Research Ethics Officer, Research office
The chancellery, The University of Newcastle
University Drive, Callaghan NSW 2308, Australia
Tel no: (02) 49216333
Email: Human-Ethics@newcastle.edu.au.

२. गा.वि.स सचिव:

३. राष्ट्रिय स्वास्थ्य अनुसन्धान केन्द्र, नेपाल फोन नं. ०१-४२२७४६०

**Appendix 9: Consent form for schools – English**

Project supervisor: Prof Roger Smith
Research student: Binod Bindu Sharma
School of Medicine and Public Health
Faculty of Health and Medicine
University of Newcastle
+61024014376
roger.smith@newcastle.edu.au

**Consent form for the intervention research project:**
**Pathways to Improving Maternal Mortality in Rural Nepal**

I, on behalf of my school ……. Agree to participate in the above research project and give my consent freely. I understand that the project will be conducted as described in the Information Statement given to the school which I have retained. I recognize, my school can withdraw from the research intervention at any time and do not have to give any reason for withdrawing.

I comprehend all the activities and my school is happy to play following roles;
1. Facilitate students to engage in the development of health songs using the key message area provided.
2. Encourage and facilitate the community and students to join to develop health songs.
3. Offer cooperation and support during the organization of inter-school competition.
4. Facilitate the process of recording songs in the voice of students and local people.
5. Cooperate and support during the singing health songs in the villages.
6. Help coordinate the smooth flow of information in the communities.

I have had the opportunity to have questions answered to my satisfaction.

Print Name: _____ Date_____

Position: _____

Signature: _____

Office seal:

**Appendix 10: Consent form for video and still photography**

Project supervisor: Prof Roger Smith
Research student: Binod Bindu Sharma
School of Medicine and Public Health
Faculty of Health and Medicine
University of Newcastle
+61024014376
roger.smith@newcastle.edu.au

**Consent form for the use of still photographs and video footage for publication**
**Pathways to Improving Maternal Mortality in Rural Nepal**

I……acknowledge that I was informed of the researcher's intent to video and take photographs during the data collection and intervention research. I understand that the project will be using those records in a public way such as publication in journal. I recognise, I can ask to withdraw my records at any time and do not have to give any reason for withdrawing.

I comprehend all the potential uses of the visual records and am happy to give consent to use my video or still photograph to publish publicly.

I have had the opportunity to have questions answered to my satisfaction.

Print Name: _____ Date_____

Signature: _____

**Appendix 11: Training Interviewers – Training contents and schedule**

**Training on baseline and post-intervention survey organisation**

Participants: Local women (two from each Village Development Committee) selected by the local officials and leaders
Time 10.00 – 05.00
Venue: Jiwan Jyoti Primary school, Ramja and Higher Secondary School, Tilahar

**Training objectives**
At the end training all the participants will be able to –

1. Explain the purpose of the research program
2. Explain the key aspect of ethical issues regarding the data collection
3. Describe the importance of the information statement and reading out for the participants
4. Explain the importance of informed consent
5. Understand the components of questions
6. Understand the questioning techniques
7. Explain the procedures of data collection using tablet or iPads
8. Record information and upload data in an online environment
9. Explain why all the households of the research area to be interviewed
10. Make sure they have the supplies (stamp pad, diary, pen, tablet or iPad that is fully charged, information statement for each respondent, register and bag) needed during the data collection
11. Make sure that their mobile phone is recharged to be able to communicate with the amount provided them for communication
12. Communicate timely of the progress of the data collection or if there is any problem while in the villages

**Training session design**

| Day | Time | Contents | Activities | Methods |
|---|---|---|---|---|
| 1 | 10.00 - 10.10 | Registration | Registration of the participants | Recording of the names |
| | 10.10 - 10.30 | Introduction | Individual sharing | Self-introduction |
| | 10.30 - 11.00 | Purpose of research program | Lecture | Sharing and question answer |
| | 11.00 - 11.25 | Research program and the key aspect of ethical issues regarding the data collection | Sharing | Question and answer |
| | 11.25 - 12.25 | Importance of information statement and reading out the information to the participants | Lecture | Question and answer |
| | 12.25 - 12.45 | Refreshments | | |
| | 12.45 - 02.45 | Informed consent and its importance | Lecture | Demonstration and practices |

| | | | | |
|---|---|---|---|---|
| | 02.45 - 03.15 | Research questionnaire and its components | Sharing | Group study and question and answer |
| | 03.45 - 05.00 | Questioning techniques and role plays | Lecture | Role play and question and answer |
| 2 | 10.00 - 12.25 | Use of tablets or iPads for data collection<br>Data recording and upload of data and practice | Demonstration | Practical session |
| | 12.25 - 12.45 | Refreshments | | |
| | 12.45 - 01.45 | Data recording and upload of data and practice - Continue | Demonstration | Practical session |
| | 01.45 - 02.00 | Importance of collecting information from all the households of the research area | Lecture | Question and answer |
| | 02.00 - 02.30 | Supplies to take during data collection: Stamp pad, diary, pen, tablet or iPad that is fully charged, information statement for each respondent, register and bag | Discussion | Sharing |
| | 02.30 - 03.00 | Communication during data collection<br>Timely communication of progress or any problem while in the villages | Sharing | Question and answer |
| | 03.00 - 03.20 | Management of issues raised during data collection | Sharing | Question and answer |
| | 03.20 - 04.00 | Other issues:<br>Plastic cover or water proof box for the tablet or iPad<br>Recharge your device<br>Recharge your mobile<br>Umbrella<br>Torches<br>Keep something to eat in the bag<br>Any other issues raised by the participants | Discussion and finalisation on specific issues | Group discussion |
| | 04.00 - 05.00 | Data collection route plan<br>Administrative and finance management | Group discussion | Question and answer |

**Participants**

1. Chitre Village Development Committee- 2
2. Ramja Deurali Village Development Committee- 2
3. Falebas Khanigaun Village Development Committee- 2
4. Mudikuwa Village Development Committee- 2

| SN | Name of interviewers | Name of Village Development Committees |
|---|---|---|
| 1 | Santoshi | Chitre Village Development Committee |
| 2 | Sushma | Chitre Village Development Committee |
| 3 | Babita | Ramja Deurali Village Development Committee |
| 4 | Subhadra | Ramja Deurali Village Development Committee |
| 5 | Rama | Falebas Khanigaun Village Development Committee |
| 6 | Indira | Falebas Khanigaun Village Development Committee |
| 7 | Binu | Mudikuwa Village Development Committee |
| 8 | Bhawana | Mudikuwa Village Development Committee |

**Appendix 12: Key messages developed in local language**

## गर्भावस्था तथा सुरक्षित सुत्केरी सम्बन्धि जरुरी सन्देश
## (गर्भवती तथा उनका परिवारका सदस्यको लागि)

**१. स्वास्थ्य जाँच**

- गर्भवती महिलाले गर्भावस्थामा कम्तिमा पनि **चार** पटक स्वास्थ्य जाँच गर्नु पर्छ

**२. खाना**

- गर्भवती महिलाले प्रत्येक **४/४** घण्टामा खान खानु पर्छ
- गर्भवती महिलाले सन्तुलित रुपमा आफ्नो खानामा – दाल-भात, तरकारी, माछामासु र मकै समावेश गर्नु पर्छ, साथै दुधसँग आइरन (Iron) चक्की लिनु आवश्यक हुन्छ

**३. आराम**

- गर्भवती महिलाले प्रत्येक दिन कम्तिमा **८** घण्टा (४/४ घण्टा) कुनै बाधा विना सुत्नु आवश्यक हुन्छ
- स्वास्थ्य तथा निरोगी बच्चाको लागि: गर्भवती महिलाले गर्भवती भएको **४** महिना पछी ग्रहौँ काम तथा लामो समय काम नगर्ने,
- प्रत्येक **४/४** घण्टामा आफ्नो खुट्टामा शरीरको भर नपर्ने गरि आराम गर्ने

**४. सुत्केरी गराउने योजना सम्बन्धि**

- गर्भावस्था र सुत्केरी सम्बन्धि योजनाबारे **(४ जना) सासु, ससुरा, श्रीमान, महिला स्वास्थ्य स्वयंसेविका** ले छलफल गर्ने
- सुत्केरी हुने समय भन्दा **४** हप्ता आगाडी नै स्वास्थ्य संस्था तथा स्वास्थ्य प्राविधिकलाई खबर गर्ने
- कम्तिमा पनि सुत्केरी हुने समय/दिन भन्दा **४** दिन आगाडी नै यातायातको (स्ट्रेचर, **एम्बुलेन्स**) व्यावस्था गर्ने

**Appendix 13: Training intervention teams – Training contents and schedule**

**Training on winning songs and management of intervention sessions**

Participants: Teachers, Traditional singers, Students and Local leaders)
Date: 12-13 July 2016
Time 10.00 – 05.00
Venue: Health post building - Ramja Deurali Village Development Committee

**Objectives of the training**

At the end of training all the participants will be able to –

1. Explain the purpose of the intervention program
2. Explain the key messages to be imparted through the songs
3. Finalize the songs from the songs developed earlier by the people for intervention
4. Practice singing
5. Discuss and develop the route plan for the intervention sessions.
6. Finalise the locations (Route plan) for education sessions
7. Discuss and develop the wall chart distribution plan (convenient places to store the wall chart in Ramja Deurali and Chitre)
8. Finalise the time(s) for intervention
9. Discuss the logistics and other practical issues (if any)
10. Identify the ways to use tent while it is raining during singing sessions
11. Discuss the use of banner during awareness/singing sessions
12. Identify the ways to keep the musical instruments dry? Should they be carried in basket covered with plastic or in the tin box?

**Training schedule**

| | | | | |
|---|---|---|---|---|
| **Day** | **Time** | **Contents** | **Activities** | **Methods** |
| 1 | 10.00 - 10.10 | Registration | Registration of the participants | Recording the names |
| | 10.10 - 10.30 | Introduction | Introducing each other | Self-introduction |
| | 10.30 - 11.00 | Introduction to intervention program | Sharing | Lecture |
| | 11.00 - 11.25 | The key health messages to be imparted | Sharing | Lecture |
| | 11.25 - 12.25 | Revision and scanning of the songs developed by the different groups | Revision of the songs | Playing the audio and visual records |
| | 12.25 - 12.45 | Tea break | | |
| | 12.45 - 02.45 | Finalisation of songs to be sung during intervention | Selection and finalisation | Playing the audio and visual records |
| | 02.45 - 03.15 | Refreshments | | |
| | 03.45 - 05.00 | Practice the song identified for the intervention | Practice of the songs selected | Practice / rehearsal |

| | | | | |
|---|---|---|---|---|
| 2 | 10.00 - 12.25 | Practice the song identified for the intervention | Practice of the songs selected | Practice/ rehearsal |
| | 12.25 - 12.45 | Tea break | | |
| | 12.45 - 02.45 | Development of intervention schedule; a route plan for each Village Development Committee | Development of intervention route plan | Group work and presentation |
| | 02.45 - 03.15 | Refreshments | | |
| | 03.15 - 05.00 | Other issues to be discussed and finalised<br>1. Porter<br>2. Finalisation of time for awareness sessions<br>3. Storing wall chart<br>4. Distribution of wall chart<br>5. Mobilisation of town crier during the intervention<br>6. Basket with plastic cover or the tin box<br>7. Banner<br>8. Use of tent while it is raining!<br>9. Umbrella!<br>10. Torches / lights | Discussion and finalisation on specific issues | Group discussion |

**Logistics to be arranged and discussed**

1. Chair or bench for 15 -17 persons
2. Arrangements for tea and refreshments 15 - 17 persons
3. Stationary (note pad and pen- 15 sets)
4. Water - (to be boiled)
5. Glasses for water
6. Umbrella – 7 during intervention (The Chitre team will hand over the umbrella to Ramja Deurali team upon completion of the program in Chitre)
7. Discuss about the management of porter (Will team Chitre and Ramja Deurali arrange a porter locally to be paid by the program?)
8. Basket or tin Box?
9. Nail and hammer (1000 nails) to hang the Holy Duty wall chart on the wall
10. Do we need individual torches / lights?
    a. To be discussed and finalised

**Participants**

| SN | Name | Name of VDC | Position | Role |
|---|---|---|---|---|
| 1 | Eak Narayan | Chitre | Head teacher | Team leader |

| | | | | |
|---|---|---|---|---|
| 2 | Dandapani | Chitre | Community leader | Program coordinator |
| 3 | Tanka | Chitre | Teacher | Team member |
| 4 | Ganga | Chitre | Teacher | Team member |
| 5 | Krishna KC | Chitre | Teacher | Team member |
| 6 | Krishna | Chitre | Teacher | Team member |
| 7 | Bhim | Chitre | Teacher | Team member |
| 8 | Santoshi | Chitre | Local woman | Wall chart distributor and mobilisation of town crier |
| **SN** | **Name** | **Name of VDC** | **Position** | **Role** |
| 1 | Babu Ram | Ramja Deurali | Teacher | Team leader |
| 2 | Dandapani | Ramja Deurali | Community leader | Program coordinator |
| 3 | Chakra | Ramja Deurali | Traditional singer | Team member |
| 4 | Raju | Ramja Deurali | Local youth | Team member |
| 5 | Punam | Ramja Deurali | Local student | Team member |
| 6 | Dipika | Ramja Deurali | Local student | Team member |
| 7 | Hari | Ramja Deurali | Local youth | Wall chart distributor mobilisation of town crier |

**Appendix 14: Songs selected for intervention**

**गीत १ लय (भजन)**
**Song: 1 Melody (Bhajan- Traditional lyrics)**

१. महिनावारी रोकिएका महिला दिदि वहिनी २

स्यमसेविकालाई खबर गर्नु गर्भ रह्योकी भनि

Women who experience amenorrhea, inform volunteer to ensure if it is pregnancy!
Mahinawari rokiyeka mahila didi bahini, swayamsebika lai khabar garnu garbha rahyoki bhani

हा: चेक गराऊँ है हेल्पोष्टमा गई, घरमा आराम गर्नु पर्छ पौष्टिक तत्व खाई

Visit health post for antenatal check- up, have nutritious food and rest at home
Check garau hai health post ma gai gharma aram garnu pacrchha paustik tatwa khai

२. गर्भवती महिलाको आहारा छ कस्तो २

दाल-भात, फलफुल, सागपात, दुध-दहि, मासु जस्तो,

What kind of meal should the pregnant have? It should include lentil, rice, meat, milk and fruits
Garbhawati mahilako aahara chha kasto? Dal Bhat falful sagpat dudh dahi masu jasto

हा: कहाँ जानु भयो सासु आमा खै, दिनमा चार पटक खाना खुवाउनु है

Mother-in-law, please feed the expecting mother four times a day
Kaha janu bho sasu ama khai dinma char patak khana khuwaunu hai

३. महिनावारी रोकिएको चार महिना भयो २

पहिलो पटक चेक गर्न जनिबेला आयो

It has been four months of pregnancy, it is the time to first visit antenatal check-up
Mahinawari rokiyeko chara mahina bhayo, pahilo patak check garna janibela bhayo

हा :गर्भरहेको चार महिना भो, आइरन चक्की नियमित खुवाउनी बेला हो

From the beginning of fourth month of pregnancy, iron tablet should be taken regularly
Garbha raheko char mahina bho iron chakki niyamit khuwauni bela bho

४. प्रत्येक दिन कम्तिमा आठ घण्टा सुत्नु पर्छ २

टि टि खोप नदिएमा स्वास्थ्य हानी गर्छ

One should sleep at least eight hours a day, not taking the TT vaccine will harm the health
Partek Dina kamtima aath ghanta sutnu parchha, TT khopa nadiyema swasthya hani garchha

हा: गर्भवतीको ज्यान गरुङ्गोभो, खुट्टामा भार नपारौ बस्नु राम्रो हो

The pregnant mother has a growing baby, she should be encouraged to take rest
Garvawatiko jyan garungo Bho, khuttama ma bhar naparau basnu ramro ho

५. नभनौ है सासु आमा हाम्रो पाला कस्तो २

जमानाले परिवर्तन ल्याउँदै जान्छ यस्तो
Mothers-in-law, do not say that we didn't rest in our times, we need to improve our practices with the time
Nabhanau hai sasu ama hamro pala kasto, jamanale paribartan lyaudai janchha yasto

हा: उद्धार गराऊँ है आमा शिशुलाई, चार हप्ता आगाडी हेल्पोष्ट लैजाऊँ है
Let us save the mothers and babies, take them to the health post four weeks before the delivery
Uddhar garau hai ama shishu lai char hapta agadi health post laijau hai

६. गर्भावस्था ८ महिनाको आयो अव बेला २
यस्तो बेला कसैले नि नगर्नु है होला
It has been eight months of pregnancy, nobody should ignore her at this stage
Garbhabastha aath mahina ko aayo aba bela, yasto bela kasaile ni nagarnu hai hela

हा: छलफल गर्नु है जाँच गराऊँ है, श्रीमान, सासु, ससुरा, स्वयंसेविका भै
Discuss together with husband, mother-in-law, father-in-law and volunteer to ensure the antenatal check-ups
Chhalphal garnu hai janch garau hai shreeman, sasu, sasura, swyamsebika bhai

७. जुटाउनु है ससुरा बा दाम पैसा खोजी २
महिला स्वास्थ्य स्वयंसेविका फोन गर्नु सोधी
Father-in-law, please make sure we have enough resources and contact the female community health volunteer
Jutaunu hai sasura ba dam paisa khoji, mahila swathya swayam sebika fone garnu sodhi

हा: गर्भ रहेको ९ वै महिना भो, स्टेचरको तयारी गर्ने बेला हो
It has been nine months of pregnancy, it is the time to arrange stretcher for transportation
Garbha raheko nabai mahina bho stretcher ko tayari garne bela bho

**गीत: २ लय (छिनको छिनैमा)**
**Song: 2 Melody (Chin ko chinaima)**

१. पहिलो जाँच ४ महिना लाएसी, गर्नु पछि ६, ८, ९ महिना भएसी
First antenatal visit on fourth month and then on sixth, eighth and ninth
Pahilo janch char mahina layesi garnu pachhi chha, aath, nau mahina bhayesi

गर्भवतीलाई स्वास्थ्य जाँच गराऊ है चार पटक हेल्पोष्ट गई
Let us ensure at least these four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

२. चार पटक स्वास्थ्य जाँच गर्नलाई
गर्भवती सुरक्षित बन्नलाई सुरक्षित बन्नलाई
Visiting four times for health check-up
Is to ensure safer pregnancy

Char patak swasthya janch garna lai
Garbhawati surakshit bannalai surakshit bannalai

गर्भवतीलाई स्वास्थ्य जाँच गराऊ है चारपटक हेल्पोष्ट गई
Let us ensure four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

३. गर्भवतीलाई ४ पटक खाना खुवाउँ

चार पटक खाना खुवाउँ आमा बच्चा दुबैको ज्यान जोगाउँ
Let us feed pregnant, at least four times a day
Feed the mother four times; lets save lives of both mother and baby
Garbhawati lai char patak khana khuwau
Char patak khana khuwau ama bacha dubaiko jyan jogau

गर्भवतीलाई स्वास्थ्य जाँच गराऊ है चार पटक हेल्पोष्ट गई
Let's ensure four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

४. चार घण्टा समयको फरकमा समयको फरकमा

पौष्टिक आहारा खुवाउनु है घरमा
In every four hours
Let's feed her nutritious food at home
Char ghanta samaya ko farak ma samaya ko farak ma
Paustik ahara khuwaunu hai ghar ma

गर्भवतीलाई स्वास्थ्य जाँच गराऊ है चार पटक हेल्पोष्ट गई
Let's ensure four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

५. गर्भ जाँच्न चार पटक जानु है चार पटक जानु है

आइरन चक्की लगातार खानु है
Visit at least four times for antenatal check-up
Take the iron supplement tablets regularly
Garbha jachna char patak janu hai - char patak janu hai
Iron chakki lagatar khanu hai

गर्भवतीलाई स्वास्थ्य जाँच गराऊ है चार पटक हेल्पोष्ट गई
Let's ensure four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

६. राम्रो गर्छ फलफुल र मासुले फलफुल र मासुले

दिनु साथ श्रीमान र सासुले
Fruits and meat are beneficial and essential
Care and support should be given by the husband and mother-in-law
Ramro garchha falful ra masu le- falful ra masu le
Dinu saath shreeman ra sasule

गर्भवतीलाई स्वास्थ्य जाँच गराऊ है चार पटक हेल्पोष्ट गई
Let us ensure four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

७. नपारौ है खुट्टालाई भारमा खुट्टालाई भारमा
गर्नु पर्छ सुतेर आराम
Do not let mother to do heavy physical work
Should get rest by laying on the bed
Naparau hai khuttalai bharma- khuttalai bharama
Garnu parchha Sutera Aram

गर्भवतीलाई स्वास्थ्य जाँच गराऊ है चार पटक हेल्पोष्ट गई
Let us ensure four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

८. गर्भवतीलाई नगराउ भारि काम नगराउ भारि काम
भन्छिन तिनले ८ घण्टा आरम पाम
Do not let pregnant be involved in long and heavy work
She merits to have rest for at least eight hours
Garbhawati lai nagarau bhari kam nagarau bhari kam
Bhanchhin tinle aath ghanta aram paau

गर्भवतीलाई स्वास्थ्य जाँच गराउ है चार पटक हेल्पोष्ट गई
Let us ensure four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

९. आठ महिनाको गर्भ भो अहिलेलाई गर्भ भो अहिलेलाई
खबर गर्नु चार हप्ता पहिले नै
Now it has been eight months of pregnancy
Inform the healthcare providers four weeks in advance
Aath mahina ko garbha bho ahilelai - garbha bho ahilelai
Khabar garnu char hapta pahilai nai

गर्भवती लाई स्वास्थ्य जाँच गराऊ है चार पटक हेल्पोष्ट गई
Let us ensure four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

१०. पैसा वचत गर्नु है घरमा गर्नु है घरमा
जन्माउ शिशु डाक्टरको भरमा
Arrange the finances ready at home
Let us make sure it is a trained delivery
Paisa bachat garnu hai gharama
Janmau shishu daktar ko bhara ma
गर्भवतीलाई स्वास्थ्य जाँच गराऊ है चार पटक हेल्पोष्ट गई
Let us ensure four antenatal check-ups at health post
Garbhawati lai swasthya janch garau hai char patak helth post ma gai

**गीत: ३ लय (पुर्वैमा झ्याल राखे)**
**Song: 3 Melody (Purbaima jhyal rakhe)**

१. सबैले पुरयाउ ध्यान

गर्भवतीको स्याहार सुसार नगरे अकालमै जान्छ ज्यान
Let us be mindful
If we do not care, the pregnant woman will die
Sabaile puryau dhyan
garbhawatiko syahar susar nagare akalmai janchha jyan

२. पहिलो जाँच ४ महिना भएसी

थाहा हुन्छ हस्पिटल गएसी
First check-up on the fourth month, we know the status of health once we visit to the hospital
Pahilo janch char mahina bhayasi, thaha hunchha hospital gayesi

सबैले पुरयाउ ध्यान
गर्भवतीको स्याहार सुसार नगरे अकालमै जान्छ ज्यान
Let us be mindful
If we do not care, the pregnant woman will die
Sabaile puryau dhyan
garbhawatiko syahar susar nagare akalmai janchha jyan

३. दोस्रो जाँच पुगेसी ६ महिना

स्वास्थ्य भन्दा ठुलो त केहि छैन
Second check-up on the sixth month, nothing is more important than the health
Dosro janch pugesi chha mahina, Swasthya bhanda thulo ta kehi chhaina

सबैले पुरयाउ ध्यान
गर्भवतीको स्याहार सुसार नगरे अकालमै जान्छ ज्यान
Let us be mindful
If we do not care, the pregnant woman will die
Sabaile puryau dhyan
garbhawatiko syahar susar nagare akalmai janchha jyan

४. तेश्रो जाँच ८ महिना लाएसि

फाइदा गर्छ थप खाना खाएसि
Third check-up on the eighth month, additional nourishment is essential
Teshro janch aath mahina layasi, faida garchha thap khana khayasi

सबैले पुरयाउ ध्यान
गर्भवतीको स्याहार सुसार नगरे अकालमै जान्छ ज्यान
Let us be mindful
If we do not care, the pregnant woman will die
Sabaile puryau dhyan
garbhawatiko syahar susar nagare akalmai janchha jyan

५. चौथो जाँच नौ महिना जचाउनु

आमा बच्चा दुबैलाई बचाउनु
Fourth check-up on the nine-month, save both mother and baby
Chautho janch nau mahina jachaunu, aama bacha dubailai bachaunu

सबैले पुरयाउ ध्यान
गर्भवतीको स्याहार सुसार नगरे अकालमै जान्छ ज्यान
Let us be mindful
If we do not care, the pregnant woman will die
Sabaile puryau dhyan
garbhawatiko syahar susar nagare akalmai janchha jyan

६. टाढा टाढा नजानु मेलामा

गर्भवती भएको बेलामा
Do not walk far distances for the chores during pregnancy
Garbhawati bhayeko belama, Tadha tadha najanu melama

सबैले पुरयाउ ध्यान
गर्भवतीको स्याहार सुसार नगरे अकालमै जान्छ ज्यान
Let us be mindful
If we do not care, the pregnant woman will die
Sabaile puryau dhyan
garbhawatiko syahar susar nagare akalmai janchha jyan

७. बेला बेला स्वास्थ्य जाँच गराउनु

गाह्रो भारि उठाउन डराउनु
Visit timely for the health check-up, be careful not to lift the heavy load
Bela bela swasthya janch garaunu, garho bhari uthauna daraunu

सबैले पुरयाउ ध्यान
गर्भवतीको स्याहार सुसार नगरे अकालमै जान्छ ज्यान
Let us be mindful
If we do not care, the pregnant woman will die
Sabaile puryau dhyan
garbhawatiko syahar susar nagare akalmai janchha jyan

८. गर्भ जाच्ने स्वास्थ्यमा गएर

फर्कनु है टि.टि. खोप लाएर
Visit health post for antenatal check-up, make sure you have TT vaccine
Garbha Jachne swasthya ma gayera, farkanu hai titi khop layera
सबैले पुरयाउ ध्यान
गर्भवतीको स्याहार सुसार नगरे अकालमै जान्छ ज्यान
Let us be mindful
If we do not care, the pregnant woman will die
Sabaile puryau dhyan

garbhawatiko syahar susar nagare akalmai janchha jyan

९. ध्यान दिइएमा श्रीमान सासुले

राम्रो गर्छ माछा र मासुले
Support of mother-in-law and husband is essential, meat and fish are recommended during pregnancy
Dhyan diyema shreeman sasule, ramro garchha machha ra masu le

सबैले पुरयाउ ध्यान
गर्भवतीको स्याहार सुसार नगरे अकालमै जान्छ ज्यान
Let us be mindful
If we do not care, the pregnant woman will die
Sabaile puryau dhyan
garbhawatiko syahar susar nagare akalmai janchha jyan

**गीत: ४ लय (खुसि छैन मन)**
**Song: 4 Melody (Khusi chhaina man)**

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

१. गर्भ खेर नजाओस कामले

चार पटक जचाउनु आमाले
The pregnant woman ought to visit four times for antenatal check-up, do not let abortion to occur due to heavy work
Garbha khera najawos kamale, char patak jachaunu amale

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

२. पहिलो जाँच ४ महिना भएसि

थाहा हुन्छ हस्पिटल गएसि
The first check-up should be done in the fourth month of pregnancy. Once you visit hospital you will be informed of the health situation
Pahilo janch garnu pardachha char mahina bhayasi, Sabai kuro thaha hunchha hospital gayasi

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

३. दोस्रो जाँच पुगेसी ६ महिना

स्वास्थ्य भन्दा ठुलो त केही छैन
Second check-up on the sixth month, nothing is more important than the health

Dosro janch pugesi chha mahina, swasthya bhanda thulo ta kehi chhaina

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

४. थाहा पाइन्छ हस्पिटल गएसी

तेश्रो जाँच ८ महिना भएसी
We know the status of health once we visit hospital, the third check-up at the eighth month
Thaha painchha hospital gayasi, tesro janch nau mahina layesi

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

५. सबै थाहा हस्पिटल धाएसि

चौथो जाँच नौ महिना लाएसी
Visiting hospital give us every detail of the health situation, the fourth visit on the ninth month
Sabai thaha hospital dhayasi, chautho janch nau mahina layesi

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

६. मिठो बोलौ सबले घर धन्दामा

खाना खुवाउनु प्रत्येक ४ घन्टामा
Everybody speaks softly at home, and feed pregnant woman in every four hours
Mitho bolau sable ghar dhanda ma, khana khuwaunu pratek char ghantama

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

७. माया गर्नु श्रीमान र सासुले

फाइदा गर्छ माछा र मासुले
Husband and mother-in-law, your love and affection matters, meat and fish are recommended during pregnancy

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

८. हरियो सागपात पहेला फलफुल

दुध, दहि, घिउ, खाई हुनु है प्रफुल्ल
If you take green vegetable, yellow colored fruits and milk, yoghurt and ghee (butter), you will be happy and healthy

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

९. मनमा पिर नलिनु कुनै दिन

माछा मासु खाउ अन्डा भिटामिन
Take fish, meat, egg and vitamin, be stress free everyday
Manma pira nalinu kunaidin, machha masu khau anda vitamin

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

१०. पानि बोक्न नगए धारामा

८ घण्टा गर्नु है आराम
Take rest eight hours every day, do not go far to fetch water
Pani bokna nagaye dharama, aath ghanta garnu hai aaram

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

११. ख्याल गर्नु है सुत्दा र बस्दा

स्टेचरको गर्नु है व्यावस्था
Be careful to take timely rest, arrange stretcher for her transportation to the health post
Khyal garnu hai sutda ra basda, stretcher ko garnu hai byabastha

नपठाउनु वन, गर्भवती महिलाको खुसि राखौ मन
Let pregnant remain stress free, do not send her to the Jungle
Napathaunu ban, garbhawati mahilako khusi rakhau man

**गीत: ५ लय (गन्दर्ब भाका - रेलिमाई)**
**Song: 5 Melody (Traditional, Gandharba - Relimai)**

१. स्वास्थ्य आमा रेलिमाई स्वास्थ्य बच्चा

जीवनमा रेलिमाई भइन्छ निर्धक्क
Healthy mother and healthy baby, makes life free from the worries and anxieties
Swasthya ama relimai swasthya Bachha jeeban ma relimai bhainchha nirdhakka

२. नेपालको कानुनको सुन्नुहोस केहि कुरा

१८ वर्ष महिला अनि २० वर्ष पुरुष

नपुग्दैमा विहेवारि गरि हाल्यो भने

Please listen the provision made by the law of Nepal
If married before eighteen years female and twenty years male,
Nepal ko kanun ko sunnuhos kehi kura
Athara barsha mahila ani twenty barsha purush
Napugdaima bihe bari gari halyo bhane

कानुनले समात्ने छन् यति कुरा जान्नु
Remember, it will be punishable by the law
Kanunle samatne chhan yati kura jannu

३. बच्चा पाउने रेलिमाई सेटल भएसी

२०-२५ रेलिमाई उमेर भएसी
We plan to have baby, once we are twenty – twenty-five and settled
Bachha paune relimai settle bhayasi, bias pachhis relimai umer bhayasi

४. जुन घरले स्वास्थ्य बच्चा जन्माउन सक्छ

घरपरिवार, समाज अनि राज्यले नी देख्छ
The house is credited by the society and the nation, if they are able to deliver a healthy baby
Jun gharale swasthya bacha janmauna sakchha, gharpariwar, samaj ani rajya le ni dekhchha

५. गर्भधारण भएको थाहा हुदा साथ

गर्भ जाँच गराउनु नमानेर लाज
Make sure of antenatal check-up, do not be shy
Garbha dharan bhayeko thaha hunda saath, garbha janch garaunu namanera laaj

६. कम्तिमा नी रेलिमाई चार पटक जचाउनु

सन्तुलित रेलिमाई खुराक खुवाउनु
Antenatal visit should be made at least four times, and we need to feed nourishing balanced meals
Kamtima ni relimai char patak jachaunu, santulita relimai khurak khuwaunu

७. ख्याल राख है श्रीमानले ख्याल गर सासुले

आमा बच्चा राम्रो पार्छ दुध अन्डा मासुले
Husband and mother-in-law, please be mindful that milk, egg and meat is beneficial for both the mother and baby
Khyal rakha hai shreemanle khyal gara sasule, ama bacha ramro parchha dudh anda masule

८. आइरन चक्की पनि सँग दिनहु सेवन गरौ

आमा बच्चा दुवै जना स्वास्थ्य बन्दै जाऔं
To ensure healthy mother and baby, iron tablet should be taken regularly
Iron chakki pani sanga dinahu sewan garau, ama bacha dubai jana swasthya Bandai jau

९. प्रत्येक दिन रेलिमाई ८ घण्टा सुत्नु

गह्रौ काम रेलिमाई गर्नलाई नउठनु
Pregnant woman merits at least sleep of eight hours a day, do not get her engaged in heavy and long hours work
Pratek din relimai aath ghanta sutnu, garau kama relimai garn alai nauthnu

१०. प्रसूतिको बेला आयो अरु सचेत बनौं

डाक्टरले दिएको मिति अब सबले गनौ
Be careful as the date of delivery comes closer, be responsible on the date mentioned by the doctor
Prasuti ko bela aayo aru sachet banau daktar le diyeko miti aba sable ganau

११. ४ हप्ता बाकी छदै स्वास्थ्य संस्था अनि

प्राबिधिकलाई खबर गर्ने कस्तो पर्छ भनि
Inform health worker before four weeks of delivery to ensure everything is well
Char hapta banki chhadai swasthya sanstha ani, prabhitik lai khabar garne kasto parchha bhani

१२. सासु अनि रेलिमाई श्रीमान, ससुरा

स्यम्सेबिका रेलिमाई बुझ्नु है यी कुरा
Husband, mothers-in-law, father-in-law and volunteer,
please take care of these issues
Sasu ni relimai shreeman sasura
Swayamsewika relimai bujhnu hai yi kura

१३. एम्बुलेस स्ट्रेचर चाहिने पो होकी

बाटोघाटो टाढा भए लानु पर्छ बोकी
Think in advance if we need ambulance, stretcher or if it is too remote, she should be carried by person
Ambulance stretcher chahinepo ho ki, batoghato tadha bhaye lanu pardachha boki

१४. योजना र तयारी त पहिले नै चाहिन्छ

भन्दा भन्दै यातायात खोज्दा कहाँ पाइन्छ ?
Unless we plan in advance, we won't be able to arrange transportation on time
Yojana ra tayari ta pahilenai chahinchha, bhanda bhandai yatayat kojda kaha pahinchha?

१५. ससुरा बा रेलिमाई जुटाउनु खर्च

स्वास्थ्य कर्मी रेलिमाई लाई दिनु खबर
Father-in-law arrange the finances and contact health worker on time
Sasura ba relimai jutaunu kharcha, swasthya karmi relimai li ddinu khabar

१६. अस्पताल लगि स्वास्थ्य बच्चा पैदा भयो

घरपरिवार सबै तिर हर्ष उल्लास छायो
Once we ensure safe delivery at the hospital, the happiness prevails everywhere

Aspatal lagi swasthya bacha paida bhayo, ghar pariwar sabai tira harsha ullas chhayo

१७. जन्मना साथ विगौती दुध पहिला खुवाउनु

यसैमा छ भिटामिन अन्त कहाँ पाउनु
Feed colostrum immediate after birth, all the nourishing elements are in it
Janmana sath bigauti dudh pahila khuwaunu, yasaima chha vitamin anta kaha paunu

१८. भन्छिन सासु रेलिमाई प्रमोशन भईयो

हजुर आमा रेलिमाई हजुर वा भइयो
We have been promoted as grandfather and grandmother, claims the mother-in-law
Bhanchhin sasu relimai promotion bhaiyo, hajur buwa relimai hajur ama bhaiyo

**गीत: ६ लय ( रोइला )**
**Song: 5 Melody (Roila)**

१. पहिलो जाँच गर्नुपर्छ ४ महिना भएसी

The first check-up should be done in the fourth month of pregnancy
Pahilo janch garnu pardachha char mahina bhayasi

सबै कुरो थाहा हुन्छ हस्पिटलमा गएसि
Once you visit hospital you will be informed of the health situation
Sabai kuro thaha hunchha hospital gayasi

हस्पिटल लानु है २
Take her to the hospital
Hospital lanu hai

गर्भवती महिलालाई हस्पिटल लानु है
Take the pregnant woman to the hospital
Garbhawati mahila lai hospital lanu hai

२. हे दोस्रो जाँच ६ महिनामा तेस्रो ८ महिनामा

The second check-up is on the sixth and the third on the eighth month

भुलेर पनि गर्नु हुन्न घरको गाह्रो काम
Lest the pregnant woman do the heavy work at home

(नौ महिना लाएसि) २
On the ninth month
Nau mahina layasi -2

चौथो जाँच गरौं है नौ महिनामा लएसि
Fourth check-up should be arranged on the ninth month
Chautho janch garau hai nau mahina ma layasi

३. हे चार/ चार घण्टा फरकमा खाना खानु पर्छ

A meal should be taken in every four hours
Char char ghanta farak ma khana khanu parchha

हरियो साग पात भिटामिनाले झनै फाइदा गर्छ
Green leafy vegetable and vitamins are beneficial and essential
Hariyo sag pat bhitaminle jhanai faida garchha

फलफुल दुध, घ्यु, मासुले २
Fruits, milk, ghee (butter) and meat
Falful dudh ghyu masule -2

ख्याला गर्नु सासुले
Mothers-in-law, please take care
Khyal garnu sasu le

फलफुल दुध, घ्यु, मासुले
Fruits, milk, ghee (butter) and meat
Falful dudh ghyu masule

४. हे दालभात तरकारी अनि मासु दुध
Lentil, rice, vegetable, meat and milk
Dal bhat tarkari ani masu dudha

खानु पर्छ अन्डा फलफुल पानि पनि सुद्ध
She should take egg, fruits and clean water
Khanu parchha anda falful pani pani suddha

(खान पिन मा ध्यान दिनु ) २
Be mindful on the meal
Khanpin ma dhyan dinu -2

गर्भवती महिलालाई खानपिनमा ध्यान दिनु
Be mindful on the meal pregnant woman is taking
Garbhawati mahila lai khan pin ma dhyan dinu

५. ८ घण्टा आराम गर्नु पर्छ दिनै भरि
She merits rest at least eight hours a day
Aath ghanta aaram garnu pardachha dinai bhari

४/४ घण्टा शरीरको भार खुट्टामा नपारी
Take rest every four hours
Char char ghanta sharir ko bhar khuttama napari

श्रीमान, सासु, ससुरा २
Husband, mother-in-law and father-in-law
Shreeman sasu sasura

साथ दिनु पर्छ श्रीमान, सासु, ससुरा
Husband, mother-in-law and father-in-law need to take care of her together as a team
Sath dinu parchha shreeman, sasu, sasura

६. हे सुरक्षित बच्चा पाउन श्रीमान, सासु, ससुरा
Husband, mother-in-law and father-in-law need to be attentive for safe delivery
Surakshit bacha pauna shreeman sasu sasura

महिला स्यम्सेबिकाले गर्नु पर्छ यी कुरा
Female community health volunteers should make sure these issues are taken care of
Mahila swyamsebikale garnu parchha yi kura

(श्रीमान, सासु, ससुरा) २
Husband, mother-in-law and father-in-law
Shreeman sasu sasura -2

तयारी गर्नु है श्रीमान, सासु, ससुरा
Husband, mother-in-law and father-in-law please be prepared
Tayari garnu hai shreeman sasu sasura

७. स्वास्थ्य संस्था खबर गर्नु पर्छ हाम्ले कहिले २
When we have to inform health institution?
Swasthya sanstha khabar garnu parchha hamle kahile

बच्चा जन्म हुनु भन्दा चारै हप्ता पहिले
Four weeks before the childbirth
Bachha janma hunu bhanda charai hapta pahile

चारै हप्ता अगाडी २
Four weeks before
charai hapta agadi

खबर गर्नु पर्छ चारै हप्ता आगाडी
We have to inform four weeks before
Khabar garnu parchha charai hapta agadi

**Appendix 15: Intervention and community participation – YouTube links**

The intervention research in the rural villages was a unique opportunity to document each aspect of the research environment. In addition to the core research activities, we documented every possible aspect of the research and its context in an attempt to provide complete information about the research area, people and practices. The following are videos recorded during the intervention research.

1. Intervention - thirteenth day - https://www.youtube.com/watch?v=2E9u3BC5k_A
2. Intervention - twelfth day - https://www.youtube.com/watch?v=DnNG0JAUJ3s
3. Intervention - eleventh day - https://www.youtube.com/watch?v=zUQKFFFnuN0
4. Intervention – tenth day - https://www.youtube.com/watch?v=qbBDyoqBVJ4
5. Intervention – ninth day - https://www.youtube.com/watch?v=SKnhVdFLwBA
6. Intervention – eighth day - https://www.youtube.com/watch?v=mi7RkclOFes
7. Intervention – seventh day - https://www.youtube.com/watch?v=R0nsEU4lOKk
8. Intervention – sixth day – https://www.youtube.com/watch?v=4BYa_qnyrA4
9. Intervention – fifth day – https://www.youtube.com/watch?v=tt5WyJTHn_o
10. Intervention – fourth day - https://www.youtube.com/watch?v=NVOMVojwiWM
11. Intervention – third day - https://www.youtube.com/watch?v=tsRKM4YWCrg
12. Intervention – second day - https://www.youtube.com/watch?v=amEOQ5YRN5g
13. Intervention – first day - https://www.youtube.com/watch?v=fkT7IxjRoGg
14. Training teachers and traditional singers before the intervention - https://www.youtube.com/watch?v=2jqH1BdMTu8
15. The road conditions in the village - https://www.youtube.com/watch?v=1uSbMz97fgE
17. The alternative route to Pokhara - (The Dimuwa - Ramja road is closed due to the risen water level in the Rati river) - https://www.youtube.com/watch?v=JhOJVWBAj0g
18. Traditional rice mill (Dhiki) in rural Nepal - https://www.youtube.com/watch?v=sdPEH1GYARk
19. Participation in finger millet (Kodo) cultivation with community people https://www.youtube.com/watch?v=sdPEH1GYARk
20. Traditional hand mill (flour mill), (Janto) - the rural village women use this technology everyday - https://www.youtube.com/watch?v=a6aypieBzMk
21. Participation in the cultivation of rice in the research village - https://www.youtube.com/watch?v=cyoQaLfZ-DU
22. The typical way of milking the buffalo - https://www.youtube.com/watch?v=oAOsrbQ5y-0
23. Traditional copper craft of utensil making in the research village - https://www.youtube.com/watch?v=mgnMlSolVkk
24. Presentation of the health song during the song competition - teacher's group - https://www.youtube.com/watch?v=d6F3y_n11j0
25. Presentation of the health song during the song competition – adolescents' group - https://www.youtube.com/watch?time_continue=5&v=e93Fkxcf4VA
26. Presentation of the health song during the song competition – mothers' group – https://www.youtube.com/watch?v=zZZsp05SGvM
27. Presentation of the health song during the song competition – teachers' group – https://www.youtube.com/watch?v=l3L7MRnA0cc
28. Presentation of the health song during the song competition – mothers' group – https://www.youtube.com/watch?v=RJUR7nw9pzo
29. Presentation of the health song during the song competition – female community health volunteers' group – https://www.youtube.com/watch?v=ax5AYT1i8-w

30. Presentation of the health song during the song competition – Teachers and community peoples' group – https://www.youtube.com/watch?v=xYK-Q9c3mL0
31. Presentation of the health song during the song competition – mothers' group – https://www.youtube.com/watch?v=reNXOrxlkWs
32. Presentation of the health song during the song competition – students and teachers' group – https://www.youtube.com/watch?v=VqO0wZDrNOI
33. Presentation of the health song during the song competition – students' group – https://www.youtube.com/watch?v=hV-CNg1o4js
34. Presentation of the health song during the song competition – students' group – https://www.youtube.com/watch?v=-vkZlNLmZnc
35. On the way to Chitre village to organize the song competition - https://www.youtube.com/watch?time_continue=4&v=CZiwg9repx8
36. Town Crier passing the information to the villagers about the program - https://www.youtube.com/watch?v=8S-ADstaqsc
37. Singing rehearsal of the Female Community Health Volunteers – Chitre - https://www.youtube.com/watch?v=vAtQmwmfXPI
38. The road condition in the research areas https://www.youtube.com/watch?v=ypjyzqRNKMA
39. Orientation program for the Female Community Health Volunteers – Chitre https://www.youtube.com/watch?v=y_9hm8Yri8w
40. Orientation program for the school students – Ramja - https://www.youtube.com/watch?v=7aahHFjLLRc
41. Singing rehearsal at school https://www.youtube.com/watch?v=sooV-XKv2so
42. Orientation program for the adolescents https://www.youtube.com/watch?v=Z-cHDPH58hI
43. Firewood cooking is an everyday practice in the village https://www.youtube.com/watch?v=JocC2KQe8aM
44. Playful moment with village kids https://www.youtube.com/watch?v=zioOHkC8QVo
45. Orientation to school kids Ramja Deurali Village https://www.youtube.com/watch?v=XqbWqLztezo
46. Traditional healing practices following the pregnancy complication in the research village https://www.youtube.com/watch?v=InnHX-Dj2Hw
47. An interview (data collection) with the female head of the household https://www.youtube.com/watch?v=7uhwJbuDlFk
48. Logistics arrangements for the research village https://www.youtube.com/watch?v=Z-MXKT_WRQ0

## Appendix 16: Follow-up survey – English

**Follow-up: Safer Pregnancy and Childbirth: Knowledge, Attitude and Behaviour Survey**

ID 179

**Survey and consent**

Surveyor to complete this basic demographic section for every subject ID, whether it participates or not in the survey.

ID 37

Date of interview

ID 89

Respondent's ID?

ID 3

Name of Village Development Committee (intervention)

- Chitre
- Ramja Deurali

ID 181

Next question indicates consent of participant to participate or not in the survey.

Instructions for interviewer -
1. Fill the information up to question 6 - ask the respondent from question 7.
2. Introduce yourself with respondent in following wording and format;

Hello, my name is [field worker's name], and I am on behalf of the University of Newcastle conducting a research project about pregnancy and childbirth. Here is some information about the project [Hand over information statement] [Read statement out loud to the respondent if they have difficulty reading]

ID 38

Would you like to take part in this survey by providing the information related to pregnancy and childbirth?

- Yes
- No

**Survey and consent**

ID 259

Surveyor to complete this basic demographic section for every subject ID, whether it participates or not in the survey.

ID 260

Date of interview

ID 261

Respondent's ID?

ID 262

Name of Village Development Committee (intervention)

- Chitre
- Ramja Deurali

ID 263

Next question indicates consent of participant to participate or not in the survey.

Instructions for interviewer -
1. Fill the information up to question 6 - ask the respondent from question 7.
2. Introduce yourself with respondent in following wording and format;

Hello, my name is [field worker's name], and I am on behalf of the University of Newcastle conducting a research project about pregnancy and childbirth. Here is some information about the project [Hand over information statement] [Read statement out loud to the respondent if they have difficulty reading]

ID 264

Would you like to take part in this survey by providing the information related to pregnancy and childbirth?

- Yes
- No

**Personal information**

ID 123

Ward Number

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

ID 144

Now I'm going to ask a few questions about your personal information.

ID 236

1. Are you (select the one that applies):

- Head of the household ?
- Younger respondent (18 to 30 years old) ?

ID 5

What is your contact mobile number (if applicable)?

ID 92

What is your age?

ID 7

What is your sex?

- Male
- Female

ID 8

What is your marital status?

- Never married
- Married
- Separated
- Divorced
- Widowed

ID 130

What was your age at first marriage?

- Less than 10 years
- 10-14 years
- 15-19 years
- 20-29 years
- 30-34 years
- ≥ 35 years

ID 131

What was **your** age when you had the first child?

- No children
- 15-19 years
- 20-29 years
- 30-34 years
- ≥ 35 years

ID 9

What is your highest educational attainment?

- No education
- Primary (class 1-5)
- Secondary (class 6-10)
- Higher (class 11 and above )

**Economic information**

ID 157

Now I am going to ask you about **your** family income

situation

ID 136

How many people are there in the household?

ID 10

Does anyone in the household have paid employment?

- Yes
- No

ID 118

What is the household income / annually? (in Rupees)

- Less than 10,000
- 10,000 - 49,000
- 50,000 - 99,000
- 100,000 - 299,000
- 300,000 - 499,000
- 500,000 - 999,000
- 100,0000 - 199,9000
- 200,0000 +
- I do not know

ID 155

How difficult or easy to manage on the income you have available?

- It is impossible
- It is difficult all the time
- It is difficult some of the time
- It is not too bad
- It is easy
- I do not know

**Songs**

ID 238

Now I'm going to ask about the things you learned about safer pregnancy and childbirth during the singing health messages program

ID 239

2. Do you remember the songs used to transmit the messages on the pregnancy and childbirth? (even if you don't remember the song right now)

- Yes
- No

ID 240

3. Were the messages in the songs helpful?

- Very helpful
- Somewhat helpful
- Not helpful

ID 241

4. Have you done any of the things that were in the songs ?

- Yes
- No

ID 242

5. What did you do? (select all that apply)

- ☐ Taken/sent pregnant wman for the antenatal check-ups
- ☐ Provided additional food during pregnancy
- ☐ Provided rest during pregnancy
- ☐ Planned properly for childbirth
- ☐ Provided information to the neighbours and friends
- ☐ Arranged for transport to the health post / hospital for delivery

ID 243

6. Do you still sing the songs that were sung during the program?

- ○ Yes
- ○ No

**Wall chart**

ID 244

7. Were the messages given in the wall chart helpful?

- ○ Very helpful
- ○ Somewhat helpful
- ○ Not helpful

ID 247

8. Have you done any of the things that were on the wall chart?

- ○ Yes
- ○ No

ID 246

9. What did you do? (select all that apply)

- ☐ Taken/sent pregnant wman for the antenatal check-ups
- ☐ Provided additional food during pregnancy
- ☐ Provided rest during pregnancy
- ☐ Planned for childbirth
- ☐ Provided information to the neighbours and friends
- ☐ Arranged for transport to the health post / hospital for delivery

ID 248

10. Do you still have the wall chart hanging at your home?

- ○ Yes
- ○ No

ID 250

11. Why did you keep it? (check all that apply)

- ☐ Good for the message
- ☐ It has a picture of Goddess
- ☐ It is good to have a colourful chart hanging on the wall
- ☐ I don't know

**Comments about the program**

ID 251

12. Would you like the singing program to be used in other areas of health promotion?

- Very much
- Somewhat
- No

ID 252

13. Would you like to participate in future programs?

- Very much
- Somewhat
- No

ID 256

14. Do you want to say anything about the program?

- Program was very good
- Program was somewhat useful
- Program was not useful

**Antenatal care, general**

ID 158

Now I am going to ask a few questions related to pregnancy and childbirth

ID 11

How important is an antenatal check-up?

- Not at all important
- Somewhat important
- It is essential
- I do not know

ID 74

How many times should a pregnant woman attend an antenatal check-up?

- Once
- Twice
- Three times
- Four times
- More than four times
- I do not know

**Delivery related, general**

ID 4

How important is institutional delivery?

- Not at all important
- Somewhat important
- It is essential
- I do not know

ID 97

How important is skilled delivery (delivery with the help of trained staff) at home?

- Not at all important
- Somewhat important
- It is essential
- I do not know

**Pregnancy history**

ID 15

Are there any pregnancies in the family?

- Yes (if there is more than one pregnancy, consider the women with the most advanced pregnancy)
- No

ID 17

Was there any discussion within the family about pregnancy / childbirth related plans?

- Yes
- No

ID 18

Who participated in the discussions?

- ☐ Pregnant woman
- ☐ Father-in-law of pregnant woman
- ☐ Mother-in-law of pregnant woman
- ☐ Husband
- ☐ Female Community Health Volunteer (FCHV)
- ☐ Neighbour
- ☐ Anyone else

ID 19

What was / were the decision(s) about pregnancy and childbirth?

- ☐ Decided to inform and consult Female Community Health Volunteer /Health Workers
- ☐ Decided to attend antenatal examinations
- ☐ Decided to attend a health facility for childbirth
- ☐ Decided to call skilled midwife at birth
- ☐ Decided to call traditional birth attendant
- ☐ Decided to go to traditional healer
- ☐ Decided to seek help of neighbours
- ☐ Decided to do nothing
- ☐ No decisions were made

**Pregnancy practice**

ID 20

How many time(s) has the pregnant woman visited a health facility or health worker for an antenatal examination?

- ○ None
- ○ Once
- ○ Twice
- ○ Three times
- ○ Four or more times
- ○ I do not know

ID 21

If fewer than four times (or fewer than the recommended visit(s) according to the weeks of pregnancy); why?

- ☐ Distant health facility
- ☐ No medicine at health facility
- ☐ No health staff at health facility
- ☐ Lack of money
- ☐ Unknown benefit of attending a health facility
- ☐ The other visit(s) yet to be made as schedule is/are due
- ☐ Any other reason(s);

**Pregnancy and childbirth management**

ID 161

Now I am going to ask you about previous experiences of pregnancy and childbirth management

ID 88

If you had a pregnancy in your family, who was involved with childbirth management issues?

- [ ] Husband
- [ ] Father-in-law of pregnant woman
- [ ] Mother-in-law of pregnant woman
- [ ] Aunty of pregnant woman
- [ ] Senior sisters at home
- [ ] Neighbour
- [ ] Female Community Health Volunteer
- [ ] Health worker
- [ ] Nobody

**Supplementary diet and rest**

ID 162

Now there will be a few questions about diet and rest during pregnancy

ID 120

Do pregnant women need to supplement their diet and take extra food during pregnancy?

- ○ Yes
- ○ No
- ○ I do not know

ID 139

What kind of food should be given to a pregnant woman?

- ☐ Rice
- ☐ Vegetable
- ☐ Meat
- ☐ Maize
- ☐ I do not know

ID 140

How frequently should a pregnant woman eat food?

- ○ Every two hours
- ○ Every four hours
- ○ Every six hours
- ○ Every eight hours
- ○ I do not know

**Supplementary diet and rest, continued**

ID 78

Do pregnant women need rest during pregnancy?

- It is necessary
- It is not necessary
- I do not know

ID 79

How many hours in a day should a pregnant woman rest?

- 0-4 hours
- 5-6 hours
- 7-10 hours
- More than 10 hours
- I do not know

ID 141

How often **should** a pregnant woman rest with the weight off their feet?

- Every two hours
- Every four hours
- Every six hours
- Every eight hours
- I do not know

**Childbirth planning**

ID 83

Is planning and preparation for childbirth important?

- ○ Not at all important
- ○ Somewhat important
- ○ It is essential
- ○ I do not know

ID 156

Who should be involved in planning and preparation for childbirth?

- ☐ Father-in-law
- ☐ Mother-in-law
- ☐ Husband
- ☐ Female community health volunteers
- ☐ Pregnant woman
- ☐ I do not know

ID 142

When should they inform health facility or Skilled Health Worker prior to the expected date of delivery?

- ○ Two months prior to expected date of delivery
- ○ One month prior to expected date of delivery
- ○ Two weeks prior to expected date of delivery
- ○ One week prior to expected date of delivery
- ○ It is not necessary to inform health facility or Health Worker
- ○ I do not know

ID 143

If family members plan to take the pregnant woman to a health facility for childbirth, how many days in advance should the plan of transportation be finalized?

- One day prior to expected date of delivery
- Four days prior to expected date of delivery
- One week prior to expected date of delivery
- Two weeks prior to expected date of delivery
- It is not necessary
- I do not know

ID 36

Would you like to add more about your and your family's experiences of pregnancy and childbirth?

**Thank You!**

ID 1

Thank you for taking our survey. Your response is very important to us.

## Appendix 17: Follow-up survey – Nepali

**सुरक्षीत गर्भावस्था तथा प्रसुतीः ज्ञान अवधारणा तथा व्यवहारसम्बन्धी Follow-up सर्भे २०७४**

१. अर्न्तवार्ताको मिति

२. प्रतिक्रिया/जानकारी दिनेको संकेत नं.

३. गाँउ विकास समितीको नाम (पुरानो अनुसार)

४. के तपाई यस सर्भेमा भाग लिई गर्भावस्था तथा प्रसुती सम्बन्धमा जानकारी दिन चाहँनुहुन्छ ?

- चाहँन्छु ।
- चाहँदिन ।

५. वडा नं. (पुरानो गा.वि.स. अनुसार )

- १
- २
- ३
- ४
- ५
- ६
- ७
- ८
- ९

६. मोबाईल नम्बर (यदि उपलब्ध भएमा) कृपया अगाडिको वर्षमा उल्लेख गरेको भए सोही मोबाईल नम्बर उल्लेख गर्नुहोस् ।

७. तपाईको उमेर कती हो ?

८. लिङ्ग

- पुरुष ।
- महिला ।

९. वैवाहिक अवस्था

- अविवाहित
- विवाहित
- भिन्न वस्ने
- सम्बन्ध विच्छेद
- बिधवा/बिदुर

१०.पहिलो विवाहको उमेर

- १० वर्ष भन्दा कम
- १०– १४ वर्ष
- १५–१९ वर्ष
- २० –२९ वर्ष
- ३० –३४ वर्ष
- ३५ –भन्दा माथी

११.पहिलो बच्चा हुँदाको उमेर कती थियो ?

- बच्चा नभएको
- १५ –१९ वर्ष
- २० –२९ वर्ष
- ३०–३४ वर्ष
- ३५ वर्ष भन्दा माथी

१२.तपाईको परिवारमा कतजिना सदस्यहरु हुनुहुन्छ ?

१३.तपाईको अधिकतम शैक्षीक स्तर कती हो ?

- अशिक्षीत
- प्रथामिक तह (कक्षा १ देखि ५ सम्म)
- माध्यामीक तह ( कक्षा ६ देखि १० सम्म)
- उच्च शिक्षा (कक्षा ११ देखि माथी)

१४.तपाईको परिवारमा कोही सदस्यहरु रोजगारीमा हुनुहुन्छ ?

- छ ।
- छैन ।

१५.बार्षिक आम्दानी कती छ ?

- १०,००० भन्दा कम
- १०,००० देखि ४९,००० सम्म
- ५०,००० देखि ९९,००० सम्म
- १,००,००० देखि २,९९,००० सम्म
- ३००००० देखि ४९९००० सम्म
- ५००००० देखि ९९९००० सम्म
- १०००००० देखि १९९९००० सम्म
- मलाई थाहा छैन ।

१६.यस आम्दानीवाट परिवार चलाउदा कत्तीको गाह्रो तथा सजिलो हुन्छ ?

- असम्भव हुन्छ ।
- सधै गाह्रो हुन्छ ।
- कहिले काँही गाह्रो हुन्छ ।
- त्यती नराम्रो छैन ।
- सजिलै छ ।
- मलाई थाहा छैन ।

१७.पोहोर साल सुरक्षीत गर्भावस्था तथा सुत्केरी सम्वन्धमा गाईएका गितहरु तपाईलाई सम्झना छ ? (पुर्ण रुपमा सम्झना नभए पनी)

- छ ।
- छैन ।

१८.गितमा भनिएका केही कुराहरु तपाईले गर्नुभयो ?

- गरेँ ।
- गरिन ।

१९.के के गर्नुभयो ?

- गर्भवती जाँच गराउन लगेँ/पठाएँ ।
- गर्भावस्थामा थप खाना खुवाएँ ।
- गर्भावस्थामा आराम दिलाएँ ।
- बच्चा जन्माउन को लागी राम्रो योजना वनाएँ ।
- छिमेकी तथा साथीहरुलाई जानकारी दिएँ ।
- हस्पीटलमा वच्चा जन्माउन गाडिको व्यवस्था गरेँ ।

२० कार्यक्रममा गाईएका गितहरु तपाईले कहिलेकाँही गाउनुहुन्छ ?

- गाँउछु ।
- गाँउदिन ।

२१. वाल चार्ट (Wall Chart ) मा दिईएका कुराहरु उपयोगी छन ?

- छन ।
- छैनन् ।

२२. वाल चार्ट (Wall Chart ) मा दिईएका संदेस अनुसार केही गर्नुभयो ?

- गरेँ ।
- गरिन ।

२३.के के गर्नुभयो ?

- गर्भवती जाँच गराउन लगेँ/पठाएँ ।
- गर्भावस्थामा थप खाना खुवाएँ ।
- गर्भावस्थामा आराम दिलाएँ ।
- बच्चा जन्माउन को लागी राम्रो योजना वनाएँ ।
- छिमेकी तथा साथीहरुलाई जानकारी दिएँ ।
- हस्पीटलमा बच्चा जन्माउन यातायातको साधनको व्यवस्था गरेँ

२४.तपाईको घरमा अभैपनी वाल चार्ट (Wall Chart ) झुन्ड्याईएको छ ?

- छ ।
- छैन ।

२५.किन सुरक्षीत राख्नुभएको छ ?

- सन्देशहरु राम्रा छन् ।
- भगवानको तस्वीर समेत भएकोले ।
- रंगीन चित्रहरु भएकोले ।
- मलाई थाहा छैन ।

२६.गितको प्रयोगवाट स्वास्थ्य सम्वन्धी अन्य विषयहरुमा जानकारी लिन चाहाँनुहुन्छ ?

- एकदमै चाहँन्छु ।
- अलिअली चाहँन्छु ।
- चाहँदिन ।

२७ तपाई भविष्यमा सञ्चालन गरिने कार्यक्रममा सहभागी हुन चाहँनुहुन्छ ?

- एकदमै चाहँन्छु ।
- अलिअली चाहँन्छु ।
- चाहँदिन ।

२८ कार्यक्रमको वारेमा केही भन्न चाहँनुहुन्छ ?

- कार्यक्रम एकदमै राम्रो थियो ।
- कार्यक्रम केही उपयोगी थियो ।
- कार्यक्रम उपयोगी थिएन ।

२९ गर्भावस्थामा स्वास्थ्य जाँच गराउनु कत्तीको महत्वपुर्ण छ ?

- महत्वपुर्ण छैन ।
- केही महत्वपुर्ण छ ।

- एकदमै आवश्यक छ ।
- मलाई थाहा छैन ।

३०गर्भावस्थामा कती पटक स्वास्थ्य जाँच गराउनुपर्ला ?

- एक पटक
- दुई पटक
- तिन  पटक
- ४ पटक
- ४ पटक भन्दा बढी
- मलाई थाहा छैन ।

३१ स्वास्थ्य संस्थामा/हस्पीटलमा सुत्केरी गराउनु कत्तीको महत्वपुर्ण छ ?

- महत्वपुर्ण छैन ।
- केही महत्वपुर्ण छ ।
- एकदमै आवश्यक छ ।
- मलाई थाहा छैन ।

३२.दक्ष प्राविधिकवाट घरमै सुत्केरी गराउनु कत्तिको महत्वपुर्ण छ ?

- महत्वपुर्ण छैन ।
- केही महत्वपुर्ण छ ।
- एकदमै आवश्यक छ ।
- मलाई थाहा छैन ।

३३.तपाईको घरमा कोही गर्भवती हुनुहुन्छ ?

- छन् ।
- छैनन् ।

३४तपाईको घरमा सुत्केरी गराउने योजनाको वारेमा छलफल भएको थियो ?

- थियो ।
- थिएन ।

३५.छलफलमा को को सहभागी हुनुभएको थियो?

- गर्भवती महिला
- सासु
- ससुरा
- श्रीमान

- महिला स्वास्थ्य स्वयं सेवीका
- छिमेकी
- अन्य कोही

३६.छलफलवाट के निर्णय गरिएका थिए ?

- महिला स्वास्थ्य स्वयं सेवीकालाई जानकारी गराउने निर्णय भयो ।
- गर्भावस्थामा स्वास्थ्य जाँच गराउने वारे निर्णय भयो ।
- सुत्केरी स्वास्थ्य संस्थामा गराउने निर्णय भयो ।
- दक्ष प्राविधीक वोलाउने निर्णय भयो ।
- सुडेनी वोलाउने निर्णय भयो ।
- धामिकहाँ जाने निर्णय भयो ।
- केही पनी नगर्ने निर्णय भयो ।
- केही पनी निर्णय भएन ।

३७ गर्भावस्थामा स्वास्थ्य जाँच गराउन गर्भवती महिला कतिपटक स्वास्थ्य संस्थामा जानुभयो ?

- जानुभएन ।
- एक पटक ।
- दुई पटक ।
- तिन  पटक ।
- ४ पटक वा बढी ।
- मलाई थाहा छैन ।

३८.यदी चार पटक भन्दा कम भएमा किन ?

- स्वास्थ्य संस्था टाढा भएर ।
- स्वास्थ्य संस्थामा औषधी नभएर ।
- स्वास्थ्य संस्थामा प्राविधिक नभएर ।
- पैसा नभएर ।
- स्वास्थ्य संस्था जानुको फाईदा थाहा नभएर ।
- स्वास्थ्य जाँच गराउन बाँकी नै छ ।
- अन्य कारणहरु ।

३९.यदी तपाईको घरमा कोही सुत्केरी भएको भए सुत्केरी गराउने सन्दर्भमा को को संलग्न हुनुहुन्थ्यो ?

- श्रीमान
- सासु
- ससुरा
- काकीहरु

- दिदिहरु
- छिमेकी
- महिला स्वास्थ्य स्वयं सेवीका
- स्वास्थ्यकर्मी
- कोही  पनी थिएन ।

४०.के गर्भवती महिलाले गर्भावस्थामा आफ्नो आहारमा केही थप खाना समावेश गर्नु जरुरी छ ?

- जरुरी छ ।
- जरुरी छैन ।
- मलाई थाहा छैन ।

४१.गर्भवती महिलाको आहारमा कस्तो प्रकारको खानाहरु समावेश गर्नु जरुरी छ ?

- भात
- सागसब्जी
- माछामासु
- मकै
- मलाई थाहा छैन ।

४२.गर्भवती महिलाले कती कती समयमा खाना खानु पर्छ ?

- प्रत्येक २-२ घण्टामा ।
- प्रत्येक ४-४ घण्टामा ।
- प्रत्येक ६-६ घण्टामा ।
- प्रत्येक ८-८ घण्टामा ।
- मलाई थाहा छैन ।

४३.के गर्भावस्थामा आराम गर्नु आवश्यक छ ?

- आवश्यक छ ।
- आवश्यक छैन ।
- मलाई थाहा छैन ।

४४.गर्भवती महिलाले दिनमा कती घण्टा आराम गर्नु जरुरी छ ?

- ०-४ घण्टा ।
- ५-६ घण्टा ।
- ७-१० घण्टा ।
- १० घण्टाभन्दा बढी ।
- मलाई थाहा छैन ।

४५ गर्भवती महिलाले कती कती समयमा आफ्नो शरीरको भार खुट्टामा नपर्ने गरी आराम गर्नुपर्दछ ?

- प्रत्येक २-२ घण्टामा ।
- प्रत्येक ४-४ घण्टामा ।
- प्रत्येक ६-६ घण्टामा ।
- प्रत्येक ८-८ घण्टामा ।
- मलाई थाहा छैन ।

४६.के सुत्केरी गराउन योजना र तयारी आवश्यक छ ?

- आवश्यक छैन ।
- केही आवश्यक छ ।
- अत्यन्तै आवश्यक छ ।
- मलाई थाहा छैन ।

४७.सुत्केरी गराउने योजना र तयारीको लागी क-कसलाई समावेश गराउनु आवश्यक हुन्छ ?

- ससुरा ।
- सासु ।
- श्रीमान ।
- महिला स्वास्थ्य स्वयं सेवीका ।
- गर्भवती महिला ।
- मलाई थाहा छैन ।

४८.सुत्केरी हुने मितिभन्दा कती समय पहिले नै स्वास्थ्य प्राविधिक अथवा महिला स्वास्थ्य स्वयं सेविकालाई खबर गर्नुपर्छ ?

- दुई महिना पहिले ।
- एक महिना पहिले ।
- एक हप्ता पहिले ।
- आवश्यक छैन ।
- मलाई थाहा छैन ।

४९.यदी स्वास्थ्य संस्थामा सुत्केरी गराउने योजना भएमा कति दिन पहिले नै यातायातको साधनको निधो गर्नुपर्छ ?

- सुत्केरी हुने मितिभन्दा १ दिन पहिले ।
- सुत्केरी हुने मितिभन्दा ४ दिन पहिले ।
- सुत्केरी हुने मितिभन्दा १ हप्ता पहिले ।
- सुत्केरी हुने मितिभन्दा २ हप्ता पहिले ।
- आवश्यक छैन ।

- मलाई थाहा छैन

५०.गर्भावस्था र सुत्केरी सम्बन्धी तपाई र तपाईको परिवारको अनुभव बारे अरु केही थप्न चाहानु हुन्छ ?

# Appendix 18: Ethics approval- Follow-up survey

**HUMAN RESEARCH ETHICS COMMITTEE**

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

**Notification of Expedited Approval**

| | |
|---|---|
| To Chief Investigator or Project Supervisor: | **Laureate Professor Roger Smith** |
| Cc Co-investigators / Research Students: | **Mr Binod Bindu Sharma**<br>**Professor Deb Loxton**<br>**Dr Henry Murray** |
| Re Protocol: | **Pathways to Improving Maternal Mortality in Rural Nepal** |
| Date: | **06-Sep-2017** |
| Reference No: | **H-2015-0451** |

Thank you for your **Variation** submission to the Human Research Ethics Committee (HREC) seeking approval in relation to a variation to the above protocol.

Variation to conduct a follow-up survey to the intervention research which will also include a younger group of participants (aged 18-30) to identify the differences in knowledge retention among younger and elderly participants.

- Information Statement for Follow-up Survey (version submitted 21/08/2017)
- Follow-up Survey (version submitted 21/08/2017)

Your submission was considered under **Expedited** review by the Ethics Administrator.

I am pleased to advise that the decision on your submission is **Approved** effective **06-Sep-2017**.

The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal *Certificate of Approval* will be available upon request.

Associate Professor Helen Warren-Forward
**Chair, Human Research Ethics Committee**

*For communications and enquiries:*
**Human Research Ethics Administration**

Research & Innovation Services
Research Integrity Unit
The University of Newcastle
Callaghan NSW 2308
T +61 2 492 17894
Human-Ethics@newcastle.edu.au

RIMS website - https://RIMS.newcastle.edu.au/login.asp

***Linked University of Newcastle administered funding:***

| Funding body | Funding project title | First named investigator | Grant Ref |
|---|---|---|---|
| Hunter Medical Research Institute/Jennie Thomas Medical Research Travel Grant(**) | Pathways to improving maternal mortality in rural Nepal | Smith, Roger | G1600617 |

# Appendix 19: Approval Human Research Ethics Committee (HREC)

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

**HUMAN RESEARCH ETHICS COMMITTEE**

**Notification of Expedited Approval**

| | |
|---|---|
| To Chief Investigator or Project Supervisor: | **Professor Roger Smith** |
| Cc Co-investigators / Research Students: | **Mr Binod Bindu Sharma**<br>**Associate Professor Deb Loxton**<br>**Dr Henry Murray** |
| Re Protocol: | **Pathways to Improving Maternal Mortality in Rural Nepal** |
| Date: | **14-Mar-2016** |
| Reference No: | **H-2015-0451** |
| Date of Initial Approval: | **14-Mar-2016** |

Thank you for your **Response to Conditional Approval** submission to the Human Research Ethics Committee (HREC) seeking approval in relation to the above protocol.

Your submission was considered under **Expedited** review by the Ethics Administrator.

I am pleased to advise that the decision on your submission is **Approved** effective **14-Mar-2016**.

In approving this protocol, the Human Research Ethics Committee (HREC) is of the opinion that the project complies with the provisions contained in the National Statement on Ethical Conduct in Human Research, 2007, and the requirements within this University relating to human research.

Approval will remain valid subject to the submission, and satisfactory assessment, of annual progress reports. *If the approval of an External HREC has been "noted" the approval period is as determined by that HREC.*

The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal *Certificate of Approval* will be available upon request. Your approval number is **H-2015-0451**.

**If the research requires the use of an Information Statement, ensure this number is inserted at the relevant point in the Complaints paragraph prior to distribution to potential participants** You may then proceed with the research.

***Note - this approval has been granted subject to the researchers accepting final amendments to the participant information statements as made by the Senior Human Research Ethics Officer.

**Conditions of Approval**

This approval has been granted subject to you complying with the requirements for *Monitoring of Progress*, *Reporting of Adverse Events*, and *Variations to the Approved Protocol* as detailed below.

PLEASE NOTE:
In the case where the HREC has "noted" the approval of an External HREC, progress reports and reports of adverse events are to be submitted to the External HREC only. In the case of Variations to the approved protocol, or a Renewal of approval, you will apply to the External HREC for approval in the first instance and then Register that approval with the University's HREC.

- ***Monitoring of Progress***

Other than above, the University is obliged to monitor the progress of research projects involving human participants to ensure that they are conducted according to the protocol as approved by the HREC. A progress report is required on an annual basis. Continuation of your HREC approval for this project is conditional upon receipt, and satisfactory assessment, of annual progress reports. You will be advised when a report is due.

- ***Reporting of Adverse Events***

1. It is the responsibility of the person **first named on this Approval Advice** to report adverse events.
2. Adverse events, however minor, must be recorded by the investigator as observed by the investigator or as volunteered by a participant in the research. Full details are to be documented, whether or not the investigator, or his/her deputies, consider the event to be related to the research substance or procedure.
3. Serious or unforeseen adverse events that occur during the research or within six (6) months of completion of the research, must be reported by the person first named on the Approval Advice to the (HREC) by way of the Adverse Event Report form (via RIMS at https://rims.newcastle.edu.au/login.asp) within 72 hours of the occurrence of the event or the investigator receiving advice of the event.
4. Serious adverse events are defined as:
    - Causing death, life threatening or serious disability.
    - Causing or prolonging hospitalisation.
    - Overdoses, cancers, congenital abnormalities, tissue damage, whether or not they are judged to be caused by the investigational agent or procedure.
    - Causing psycho-social and/or financial harm. This covers everything from perceived invasion of privacy, breach of confidentiality, or the diminution of social reputation, to the creation of psychological fears and trauma.
    - Any other event which might affect the continued ethical acceptability of the project.

5. Reports of adverse events must include:
    - Participant's study identification number;
    - date of birth;
    - date of entry into the study;
    - treatment arm (if applicable);
    - date of event;
    - details of event;
    - the investigator's opinion as to whether the event is related to the research procedures; and
    - action taken in response to the event.

6. Adverse events which do not fall within the definition of serious or unexpected, including those reported from other sites involved in the research, are to be reported in detail at the time of the annual progress report to the HREC.

***Variations to approved protocol***

If you wish to change, or deviate from, the approved protocol, you will need to submit an *Application for Variation to Approved Human Research* (via RIMS at https://rims.newcastle.edu.au/login.asp). Variations may include, but are not limited to, changes or additions to investigators, study design, study population, number of participants, methods of recruitment, or participant information/consent documentation. **Variations must be approved by the (HREC) before they are implemented** except when Registering an approval of a variation from an external HREC which has been designated the lead HREC, in which case you may proceed as soon as you receive an acknowledgement of your Registration.

**Linkage of ethics approval to a new Grant**

HREC approvals cannot be assigned to a new grant or award (ie those that were not identified on the application for ethics approval) without confirmation of the approval from the Human Research Ethics Officer on behalf of the HREC.

Best wishes for a successful project.

Professor Allyson Holbrook
**Chair, Human Research Ethics Committee**

*For communications and enquiries:*
**Human Research Ethics Administration**

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Human-Ethics@newcastle.edu.au

RIMS website - https://RIMS.newcastle.edu.au/login.asp

***Linked University of Newcastle administered funding:***

| Funding body | Funding project title | First named investigator | Grant Ref |
|---|---|---|---|

## Appendix 20: Approval Nepal Health Research Council (NHRC)

Government of Nepal

**Nepal Health Research Council (NHRC)**

Estd. 1991

Ref. No.: 1780

**28 April 2016**

**Mr. Binod Bindu Sharma**
Principal Investigator
University of Newcastle, Hunter Medical Research Institute
Mothers and Babies Research Centre, Australia

Ref: **Approval of Research Proposal** entitled **Pathways to Improving Maternal Mortality in Rural Nepal**

**Dear Mr. Sharma,**

It is my pleasure to inform you that the above-mentioned proposal submitted on 07 April 2016 (**Reg.no. 92/2016** please use this Reg. No. during further correspondence) has been approved by NHRC Ethical Review Board on 27 April 2016.

As per NHRC rules and regulations, the investigator has to strictly follow the protocol stipulated in the proposal. Any change in objective(s), problem statement, research question or hypothesis, methodology, implementation procedure, data management and budget that may be necessary in course of the implementation of the research proposal can only be made so and implemented after prior approval from this council. Thus, it is compulsory to submit the detail of such changes intended or desired with justification prior to actual change in the protocol.

If the researcher requires transfer of the bio samples to other countries, the investigator should apply to the NHRC for the permission. The researchers will not be allowed to ship any raw/crude human biomaterial outside the country; only extracted and amplified samples can be taken to labs outside of Nepal for further study, as per the protocol submitted and approved by the NHRC. The remaining samples of the lab should be destroyed as per standard operating procedure, the process documented, and the NHRC informed.

Further, the researchers are directed to strictly abide by the National Ethical Guidelines published by NHRC during the implementation of their research proposal and submit progress report and full or summary report upon completion.

As per your research proposal, the total research amount is **NRs. 1,680,020.00** and accordingly the processing fee amount to **NRs. 50865.00.** It is acknowledged that the above-mentioned processing fee has been received at NHRC.

If you have any questions, please contact the Ethical Review M & E section of NHRC.

Thanking you,

.....
**Dr. Khem Bahadur Karki**
**Member-Secretary**

# Appendix 21: Ethics approval to record video footage and still photographs

**HUMAN RESEARCH ETHICS COMMITTEE**

**Notification of Expedited Approval**

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

| | |
|---|---|
| To Chief Investigator or Project Supervisor: | **Laureate Professor Roger Smith** |
| Cc Co-investigators / Research Students: | **Mr Binod Bindu Sharma**<br>**Professor Deb Loxton**<br>**Dr Henry Murray** |
| Re Protocol: | **Pathways to Improving Maternal Mortality in Rural Nepal** |
| Date: | **19-Sep-2017** |
| Reference No: | **H-2015-0451** |

Thank you for your **Response to Conditional Approval (minor amendments)** submission to the Human Research Ethics Committee (HREC) seeking approval in relation to a variation to the above protocol.

Variation to seek formal participant consent for use of video recordings and still photographs in publications/presentations associated with the research.

- Information Statement for Videos/Photographs (v1, dated 08/09/2017)
- Consent Form for Videos/Photographs (v1, dated 08/09/2017)

Your submission was considered under **Expedited** review by the Ethics Administrator.

I am pleased to advise that the decision on your submission is **Approved** effective **19-Sep-2017**.

The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal *Certificate of Approval* will be available upon request.

Associate Professor Helen Warren-Forward
**Chair, Human Research Ethics Committee**

*For communications and enquiries:*
**Human Research Ethics Administration**

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RIMS website - https://RIMS.newcastle.edu.au/login.asp

***Linked University of Newcastle administered funding:***

| Funding body | Funding project title | First named investigator | Grant Ref |
|---|---|---|---|
| Hunter Medical Research Institute/Jennie Thomas Medical Research Travel Grant(**) | Pathways to improving maternal mortality in rural Nepal | Smith, Roger | G1600617 |

**Appendix 22: Information ststement to collect still picture and video footage**

**Information Statement for the participants who were videod/photographed during the intervention research and follow-up survey (Baseline / Post-intervention/ Follow-up Surveys)**



Chief Investigator: Prof Roger Smith
School of Medicine and Public Health
Faculty of Health and Medicine
Hunter Medical Research Institute
The University of Newcastle
Locked Bag 1000, New Lambton, NSW, Australia 2305
Phone +61024014376
Fax +61024014394
Email roger.smith@newcastle.edu.au

**Research Project: Pathways to Improving Maternal Mortality in Rural Nepal**

Primary supervisor: Prof Roger Smith
Co-supervisor: A/Prof Deborah Loxton
Student researcher: Binod Bindu Sharma
School of Medicine and Public Health,
Faculty of Health and Medicine
The University of Newcastle, Australia

Please note that this information sheet will be translated in Nepalese language for distribution to the participants who were or to be videoed/photographed in the study area. Thank you for participating in the research and providing consent to record the videos and photographs. You are invited to participate in the follow-up survey of the research project identified above which is being conducted by Binod Bindu Sharma, a Ph.D. student from School of Medicine and Public Health, Faculty of Health and Medicine at the University of Newcastle, Australia. The research is part of Ph.D. studies supervised by Prof Roger Smith and Associate Prof Deborah Loxton from the School of Medicine and Public Health, Faculty of Health and Medicine at The University of Newcastle, Australia.

**Why the video and the still photographs are being recorded?**

The purpose of the visual records is to inform about the research context and responses towards the intervention research experience to wider community through publication. We believe this community-led process will create a substantial improvement in the level of knowledge and positive attitude towards pregnancy and childbirth management issues within the community. This will further inform researchers and community development

activists on the process and community engagement. Our project seeks to change maternal mortality from the grass roots level using health messages transmitted to the whole community using songs created within the community.

**Who can participate in the visuals?**
For the records, any seen related to research and maternal health experience people would like to express and are happy to share with wider community through publications.

**What would you be asked to do?**

If you agree to use you video or the still photograph been recorded or to be recorded, you will be invited to be videoed or photographed and may be published through public media. However, you are entirely free to withdraw your records and stop from being recorded without giving any reason of withdrawing.

**What choice do you have?**

Your choice of using the video footage and still photographs will entirely depend on your choice. Only those records of the people who have or will give their informed consent will be included in the publication. Whether or not you decide to use or take your video footage or still photographs, your decision will not disadvantage you. If you do decide to participate, you may withdraw your records from the project at any time before they are uploaded for research publication. Please note that you will not be able to withdraw your records after they have been submitted.

**How much time will it take?**

For the records, we already have will not take any additional time. As the recording will take place as you continue your responses, it also may not require any additional time

**What are the risks and benefits of participating?**

There are no anticipated risks associated with the publication of the visuals. If you find any of the video footage/still photographs not appropriate to publicly publish, you can stop or withdraw your records / recordings at any time. By providing the visual records, you will have the opportunity to share your knowledge, attitude and experience about care during pregnancy and childbirth that may help improve the services offered by the government in the future.

**How will your privacy be protected?**

The collected visual records will be stored securely (on a password protected computer / in a locked filing cabinet) in the Chief Investigator's office. Data will be retained for a minimum of 5 years as per University of Newcastle requirements.

**How will the video footage/ still photographs recorded be used?**

The collected records will contribute towards Binod's PhD thesis and may be presented in academic publications or conferences. The records may also be shared with other parties to encourage scientific scrutiny and to contribute to further research and public knowledge, or as required by law. A summary of the results may be presented to the Government of Nepal with the hope that the recommendations will be adopted to improve the services available to pregnant women.

**What do you need to do to participate?**

Please read/listen this Information Statement and be sure you understand its contents before you consent to consent for the video/ photograph recording. If there is anything you do not understand, or you have questions, please contact the researcher.

If you would like to participate, please inform us that you are happy to take your visual records and use the records we took with your verbal consent previously.

**Further information**

If you would like further information, please contact Binod Bindu Sharma (9856033932) or Secretary, Village Development Committee (contact details will be inserted) National Health Research Council, Nepal (Tel: 01-4227460) or Prof Roger Smith at The University of Newcastle, Australia. Tel: +61024014376,

Email: roger.smith@newcastle.edu.au

Thank you for considering this invitation.

| | |
|---|---|
| Signature _____ | Signature _____ |
| Prof Roger Smith | Binod Bindu Sharma |
| Chief Investigator | Student Researcher |

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2015-0451

**Complaints about this research**

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to Secretary, Village Development Committee. It is also possible to contact National Health Research Council. If an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.

**Appendix 23: Information statement for participant – follow-up survey**

**Information Statement for the Respondents of Intervention Clusters (Follow-up Survey)**



Chief Investigator: Prof Roger Smith
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Faculty of Health and Medicine
Hunter Medical Research Institute
The University of Newcastle
Locked Bag 1000, New Lambton, NSW, Australia 2305
Phone +61024014376
Fax +61024014394
Email roger.smith@newcastle.edu.au

**Research Project: Pathways to Improving Maternal Mortality in Rural Nepal**

Primary supervisor: Prof Roger Smith
Co-supervisor: A/Prof Deborah Loxton
Student researcher: Binod Bindu Sharma
School of Medicine and Public Health,
Faculty of Health and Medicine
The University of Newcastle, Australia

Please note that this information sheet will be translated in Nepalese language for distribution to the household in the study area.

You are invited to participate in the research project identified above which is being conducted by Binod Bindu Sharma, a Ph.D. student from School of Medicine and Public Health, Faculty of Health and Medicine at the University of Newcastle, Australia. The research is part of Ph.D. studies supervised by Prof Roger Smith and Prof Deborah Loxton from the School of Medicine and Public Health, Faculty of Health and Medicine at The University of Newcastle, Australia.

**Why is the research being done?**

This is a follow-up survey of the intervention research organised from April to August 2016. The purpose of the research was to promote community awareness of the importance of antenatal care and delivery by skilled assistants using health songs developed by local people. Folk media have been found to be useful tools for creating behaviour change (Jinadasa, W.M.P.K., et al, 2011). Engagement of the community in developing health songs and singing sessions established a new approach to the communication of health messages and cultural transformation in the villages. Local students, teachers, community health workers, and mothers took the leadership in the whole process of design, development and implementation of an awareness program. This community-led process created a substantial improvement in the level of knowledge and

positive attitude towards pregnancy and childbirth management issues within the community. Our project sought to change maternal mortality from the grass roots level using health messages transmitted to the whole community using songs created within the community.

**Who can participate in the research?**

For the research, a senior male or a female from each household will be invited for the interview. In addition, a younger member (aged 18 to 30 years) of the family will also be interviewed to identify the differences in the level of knowledge retention between the elderly and younger members. We plan to have equal numbers of male and female respondents from the total households to be interviewed. Please note that you are ineligible to participate if you are not senior male or female of the family and less or more than the age mentioned after the head of the household.

**What would you be asked to do?**

If you agree to participate, you will be invited to complete a survey/questionnaire about your knowledge, attitude and experience about care during pregnancy and childbirth. A numerator will ask you the questions and collect your answers using an iPad. As this is a follow-up survey, you will be asked to do this survey only once. Your responses will be uploaded to an online survey system.

**What choice do you have?**

Participation in this research is entirely your choice. Only those people who give their informed consent will be included in the project. Whether or not you decide to participate, your decision will not disadvantage you. If you do decide to participate, you may withdraw from the project at any time before submitting your completed survey. Please note that due to the anonymous nature of the survey, you will not be able to withdraw your response after it has been submitted.

**How much time will it take?**

The online survey should take about 15 – 25 minutes to complete.

**What are the risks and benefits of participating?**

There are no anticipated risks associated with participating in this research. Some of the questions deal with potentially sensitive issues. If you find any of the questions/issues upsetting you can stop your participation at any time. By participating in this questionnaire, you will have the opportunity to share your knowledge, attitude and experience about care during pregnancy and childbirth that may help improve the services offered by the government in the future.

**How will your privacy be protected?**

The collected data will be stored securely (on a password protected computer / in a locked filing cabinet) in the Chief Investigator's office. Data will be retained for a minimum of 5 years as per University of Newcastle requirements. Due to the anonymous nature of the survey/questionnaire the responses you provide will not be identifiable.

**How will the information collected be used?**

The collected data will contribute towards Binod's PhD thesis and may be presented in academic publications or conferences. Non-identifiable data may also be shared with other parties to encourage scientific scrutiny and to contribute to further research and public knowledge, or as required by law. A summary of the results may be presented to the Government of Nepal with the hope that the recommendations will be adopted to improve the services available to pregnant women. Individual participants will not be named or identified in any reports arising from the project although anonymous individual responses may be quoted.

**What do you need to do to participate?**

Please read/listen this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or you have questions, please contact the researcher.

If you would like to participate, please inform us that you are happy to take part in the research, and it will be taken/ recorded as your implied consent to participate.

**Further information**

If you would like further information, please contact Binod Bindu Sharma (9856033932) or Secretary, Village Development Committee (contact details will be inserted) National Health Research Council, Nepal (Tel: 01-4227460) or Prof Roger Smith at The University of Newcastle, Australia. Tel: +61024014376,

Email: roger.smith@newcastle.edu.au

Thank you for considering this invitation.

| | |
|---|---|
| Signature _____ | Signature _____ |
| Prof Roger Smith | Binod Bindu Sharma |
| Chief Investigator | Student Researcher |

This project has been approved for an intervention research by the University's Human Research Ethics Committee, Approval No. H-2015-0451

**Complaints about this research**

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to Secretary, Village Development Committee. It is also possible to contact National Health Research Council. If an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.

**Appendix 24: Storyboard – Intervention research video documentary**

This storyboard was established to develop an intervention research video documentary titled 'Pathways to Improving Maternal Mortality in Rural Nepal"

1) Video of Binod introducing the problem with mountains in the background

Background voice over: Binod says Namaste, my name is Binod Sharma and I am from Nepal and proud of the beauty my country possesses. But the beautiful mountains and rivers also pose a challenge to the health of pregnant women as communication and transport are so difficult. I am equally saddened by the death of pregnant women in Nepal. It has one of the highest maternal mortality rates in the world.

Each year 600,000 babies are born and over 1000 women die in relation to childbirth, from post-partum haemorrhage, eclampsia and obstructed labour.

To try to solve this problem I have been working with colleagues in Newcastle, Australia.

2) Part of the Problem is Cultural, video of scenes of village life, men and women with voice over

When a woman gets married in Nepal, she moves to her husband's house to live with him and his parents. If she becomes pregnant, decisions about her pregnancy are made by her mother-in-law, while any decisions that involve money will be made by her father-in-law. Often there is no discussion between the different people involved in decision making. Mothers-in-law gave birth at home at a time when there was no antenatal care available, and often believe that the same would be fine for their daughters-in-law. Unfortunately, this approach is associated with a high risk of death for their daughters in law.

3) Video of Binod working at Regional Health Training Centre, Pokhara.

Background voice over: This situation is a challenge for the Nepalese Ministry of Health. In the department of health in Pokhara the administrator Binod Sharma was constantly reminded of the problem as reports arrived of another maternal death.

Binod was keen to change this appalling situation but was not sure of the best approach. After reflection he applied to the University of Newcastle for a PhD program to investigate potential pathways to improving maternal mortality in rural Nepal.

4) In Newcastle he explained the problem to Professor Roger Smith, Head of the Mothers and Babies Research Centre in the Hunter Medical Research Institute.

Binod explained that when a young woman is married, she moves to the house of her husband's parents. In her new home her mother-in-law will have responsibility for organising any pregnancy related care while her father-in-law will have the responsibility for organising any financial aspects. As the mother-in-law in rural settings is unlikely to have had any antenatal care herself, she may not consider this important. Transport to a health clinic for delivery may also have financial implications for the family increasing reluctance.

Binod also explained that Nepalese people love to sing and to dance. That singing is a key part of the daily cultural life.

Roger suggested that singing may be a way of transmitting knowledge of the importance of care of the pregnant woman in a way that the Nepalese may find culturally appropriate.

5) Video with the supervisor Laureate Professor Roger Smith:

Binod engaged with Dr Henry Murray the Head of the Department of Obstetrics in Newcastle to identify the most important messages that should be transmitted to the village people regarding maternal health care.

It was identified that attending 4 antenatal visits, ensuring rest during pregnancy from heavy work, provision of iron and folate supplements, and good food were key; it was also important to plan for delivery by a skilled birth attendant.

To plan the intervention Binod consulted Professor Deborah Loxton who has extensive experience with social interventions.

The plan was developed for a singing competition in the rural villages of Nepal in which the songs had to incorporate the key messages for a healthy pregnancy and safe delivery. The songs would be judged by school teachers who have high standing within the community. The winning songs would then be taken to all the villages. Reminders of the key messages would also be posted on holy banners in each house.

Prof Loxton advised on the need for questionnaires to assess the knowledge and attitudes of the people before the intervention and after, and the need to have a control region where no singing competition would occur.

The areas for the control and intervention were decided by the toss of a coin.
Binod and the team then had to find funding to support the travel to Nepal, the training of staff to conduct the questionnaires, to purchase musical instruments and tablets to record the data. A benefactor in the form of Jennie Thomas was found. Jennie agreed to support the costs of the project. Her partner David offered to accompany the team and to take video footage of the project.

6) Video confirmation presentation:

Background voice over: With the support of his supervisors, Binod presented the final research plan to the confirmation committee of the University of Newcastle. Upon finalization and approval from the ethics committee he heads off to Nepal for the planned intervention research.

7) Photo with the Director of Nepal health research council:

Background voice over: Binod then sought the approval from the Nepal Health Research Council to undertake the project before intervention.

8) Photo meeting with the minister who comes from the same rural region of Nepal in which it is planned to conduct the program.

9) Following approval by the Nepalese Research Council it is necessary to gain the support of the local people for the project. To achieve this Binod met with village representatives.

Photo of meeting with village representatives, including women's group members, teachers, traditional healers and village seniors.

10) Photos of meeting with women members, teachers, traditional healers and village seniors.

Background voice over: He established support from National, regional, district and sub-district officials prior to the commencement of the project in the field.

11) Photo: training interviewers

In the consultation of the local officials and people, Binod organised selection and training of interviewers to prepare them for the data collection.

12) Video/ photos of surveying villagers:

Background voice over: A total of eight interviewers were trained to collect data from the male and female heads of all the households in the research areas. 1,572 (excluding the partial responses) responses were collected during baseline survey from intervention and control areas.

13) Video: Interview with the interviewer (Miss Subhadra Timilsina)

Background voice over: She feels proud of being a part of the project. I am happy to reach every household and collect their responses. It is great way of gaining information of what people are aware of regarding pregnancy.

Background voice over: After baseline data collection, Binod met with different groups of people to discuss the proposed program of intervention. He focused on the key concept area of safer pregnancy and childbirth with all the people. In the meetings, the issues of writing health songs by the different groups of people (teachers, students, mothers' groups, female community volunteers, adolescents and the adolescents) were discussed and agreed.

14) videos:

a. Meeting with adolescents.

b. Meeting with school students.

c. Meeting with female community health volunteers.

15) Video (Ramja to Chitre with Mr. Dandapani): visiting house to house to meet community leaders, mothers group members and teachers.

The community people were overwhelmed with the concept and felt ownership of the program. They were encouraged to be in the driver's seat to design, develop, advocate and organize the song competition in the community.

The dates of the competition program, provision of judges and other logistics were decided by the leadership of the community.

16) Videos of song competition:

Background voice over: To create songs that incorporate the health messages we turned to the villagers themselves, a song competition was held amongst the local people, including local mothers, teachers and school children. The songs were judged by local school teachers and health workers identified by the local people. It was anticipated that there would be about four to six groups participating in the song competition. But as the whole community was oriented on the key concepts of the health issue, song development and intervention of the songs in the villages to create awareness, there were twenty-six groups participating in the song competition. It was a big event in the village. The local people said it was the largest gathering in the history of the village.

17) Video of Female Community Health Volunteer and Village Secretary about what they had to say about the song competition and its long-term benefit to the community.

Background voice over: The village secretary and female community health volunteer have found the competition program an eye opener for the community people on the issues of safer pregnancy and childbirth. The way it has been designed, the messages of safer pregnancy and child birth has reached every household and individual.

18) Video with the statement of the principal of local higher secondary school.

Background voice over: The principal was saying to the audience that the program which was organised in the village was worth more than any monetary value. The communities have been exploited in the past with report-oriented development projects. But this is a real change making initiative to empower the community to lead healthy lives and save mothers. We thank Binod for this special undertaking.

Four award-winning songs were chosen, based on the messages, appropriate words, popular lyrics and presentation. However, the community people decided to promote six songs in house to house promotions.

19) Videos: Training teachers, students and traditional singers on the songs selected for intervention.

Background voice over: A training program was organised to practice the songs selected and other issues of team, resource and role management during the intervention.

Video – Interview with the local teacher (Mr. Babu Ram) who is leading the intervention program.

20) Photos - wall chart:

Background voice over: A holy duty wall chart with the essential messages to ensure safer pregnancy and childbirth was developed and distributed to each household of the intervention area.

21) Photos – Musical instruments:

Background voice over: In consultation of the teachers and singers, Binod arranged the traditional music instruments to be used during intervention. They were well used.

22) Photo – Banner:

Background voice over: A banner with the key messages on safer pregnancy and childbirth was developed to hang outside while performing the singing intervention.

23) Intervention starts

Shot of musical instruments as “Instruments of Change”

A Cultural Program to Improve the Health of Pregnant Women in Nepal.

24) Video of singing and dancing in the village: As mentioned the winning songs were taken to the villages by teachers, who are mostly men, and musicians in a travelling cavalcade. Songs were sung in each village accompanied by dancing.

25) Video of town crier –A town crier announced to impending arrival of the singers and musicians.

26) Video or photo - A Holy Chart giving the main points was hung in each house.

27) Videos: Villagers happily participated in the singing and dancing=relevant videos.

28) Key community members took an active interest-video of village leader copying key message.

Video: what a member of the team (Hari) who went to house to house had to say about the program.

29) Video: Women described the way things were in the past and actively looked forward to improvements in the future-video of old woman telling her story.

30) Video: A village woman (Dalli Gautam) ends thanking us for the visit and asking for more help.

31) Video post-intervention survey.

32) Video: Presentation of the findings.

33) Photo slides of the findings.

34) Video Deb: Her feeling about the intervention project and remarks.

35) Video Roger: Concluding remarks.

Background voice over:

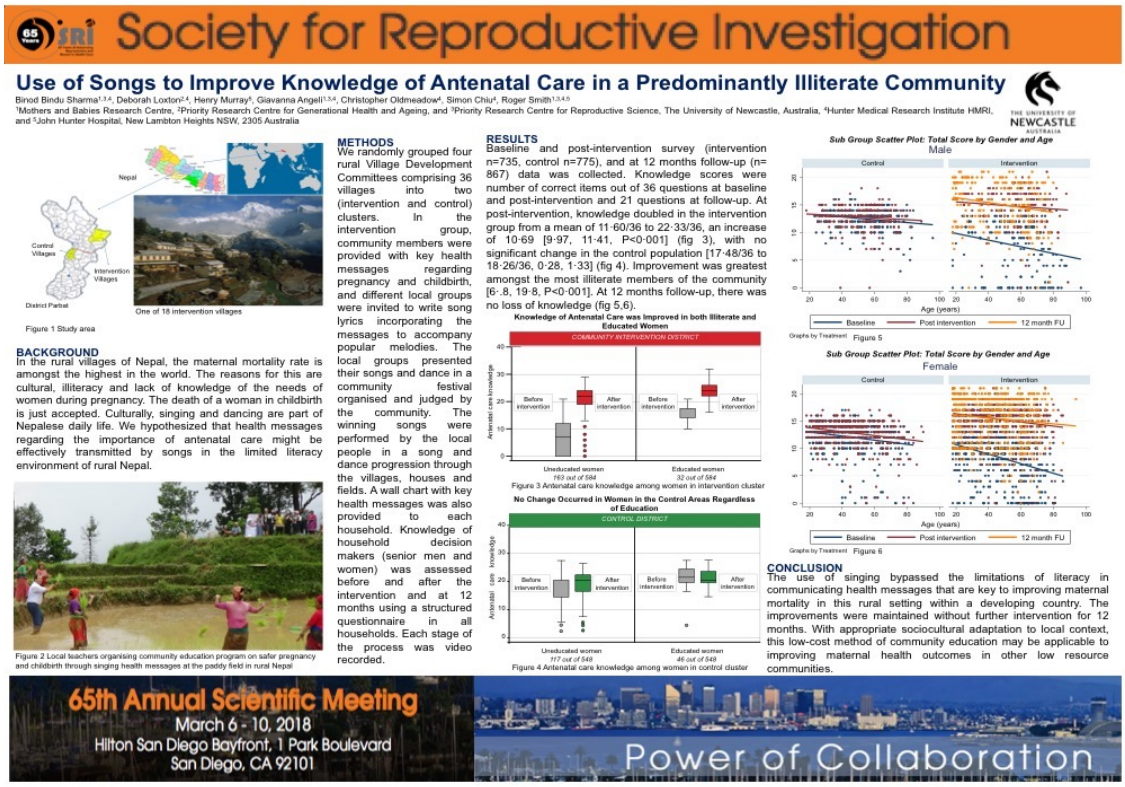
36) The findings will be interpreted and submitted to the University of Newcastle. The knowledge of community awareness will be published, and inferences will be submitted to the Government of Nepal for policy change.

The program will be scaled-up for use throughout the hill districts of Nepal. The intervention will be packaged with some service components. For example, in addition to the awareness through singing programs, there will be a provision of maternity waiting home with a birthing facility for the expectant women of hard-to-reach villages.

The project will help people use local resources and generate demands to ensure safer pregnancy and childbirth.

- Credits against back drop of mountains:
- Thanks to the villagers of the Ramja Deurali and Chitre areas of Nepal and the control area.
- Financial support: Jennie Thomas
- Video recording: David Young
- All the others listed over video and sounds of singing and pictures of Nepalese families with mothers and babies

## Appendix 25: Poster presented at 65th Annual Scientific Meeting, Society for Reproductive Investigation (SRI)



Society for Reproductive Investigation

# Use of Songs to Improve Knowledge of Antenatal Care in a Predominantly Illiterate Community

Binod Bindu Sharma[1,3,4], Deborah Loxton[2,4], Henry Murray[5], Giavanna Angeli[1,3,4], Christopher Oldmeadow[4], Simon Chiu[4], Roger Smith[1,3,4,5]
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THE UNIVERSITY OF NEWCASTLE AUSTRALIA

Nepal
Control Villages
Intervention Villages
District Parbat
One of 18 intervention villages

Figure 1 Study area

## BACKGROUND

In the rural villages of Nepal, the maternal mortality rate is amongst the highest in the world. The reasons for this are cultural, illiteracy and lack of knowledge of the needs of women during pregnancy. The death of a woman in childbirth is just accepted. Culturally, singing and dancing are part of Nepalese daily life. We hypothesized that health messages regarding the importance of antenatal care might be effectively transmitted by songs in the limited literacy environment of rural Nepal.

Figure 2 Local teachers organising community education program on safar pregnancy and childbirth through singing health messages at the paddy field in rural Nepal

## METHODS

We randomly grouped four rural Village Development Committees comprising 36 villages into two (intervention and control) clusters. In the intervention group, community members were provided with key health messages regarding pregnancy and childbirth, and different local groups were invited to write song lyrics incorporating the messages to accompany popular melodies. The local groups presented their songs and dance in a community festival organised and judged by the community. The winning songs were performed by the local people in a song and dance progression through the villages, houses and fields. A wall chart with key health messages was also provided to each household. Knowledge of household decision makers (senior men and women) was assessed before and after the intervention and at 12 months using a structured questionnaire in all households. Each stage of the process was video recorded.

## RESULTS

Baseline and post-intervention survey (intervention n=735, control n=775), and at 12 months follow-up (n=867) data was collected. Knowledge scores were number of correct items out of 36 questions at baseline and post-intervention and 21 questions at follow-up. At post-intervention, knowledge doubled in the intervention group from a mean of 11·60/36 to 22·33/36, an increase of 10·69 [9·97, 11·41, P<0·001] (fig 3), with no significant change in the control population [17·48/36 to 18·26/36, 0·28, 1·33] (fig 4). Improvement was greatest amongst the most illiterate members of the community [6·.8, 19·8, P<0·001]. At 12 months follow-up, there was no loss of knowledge (fig 5,6).

Knowledge of Antenatal Care was Improved in both Illiterate and Educated Women

COMMUNITY INTERVENTION DISTRICT

Antenatal care knowledge

Before intervention | After intervention | Before intervention | After intervention

Uneducated women 163 out of 584 | Educated women 32 out of 584

Figure 3 Antenatal care knowledge among women in intervention cluster

No Change Occurred in Women in the Control Areas Regardless of Education

CONTROL DISTRICT

Antenatal care knowledge

Before intervention | After intervention | Before intervention | After intervention

Uneducated women 117 out of 548 | Educated women 46 out of 548

Figure 4 Antenatal care knowledge among women in control cluster

Sub Group Scatter Plot: Total Score by Gender and Age
Male

Control | Intervention

Age (years)

Baseline | Post intervention | 12 month FU

Graphs by Treatment Figure 5

Sub Group Scatter Plot: Total Score by Gender and Age
Female

Control | Intervention

Age (years)

Baseline | Post intervention | 12 month FU

Graphs by Treatment Figure 6

## CONCLUSION

The use of singing bypassed the limitations of literacy in communicating health messages that are key to improving maternal mortality in this rural setting within a developing country. The improvements were maintained without further intervention for 12 months. With appropriate sociocultural adaptation to local context, this low-cost method of community education may be applicable to improving maternal health outcomes in other low resource communities.

65th Annual Scientific Meeting
March 6 - 10, 2018
Hilton San Diego Bayfront, 1 Park Boulevard
San Diego, CA 92101

Power of Collaboration

**Appendix 26: Certificate of attendance – Society for Reproductive Investigation - 65th Annual Scientific Meeting**

# CERTIFICATE OF ATTENDANCE

SRI
Science in the Service of Women's Health

**65th ANNUAL SCIENTIFIC MEETING**
**Society for Reproductive Investigation**

**March 6 - 10, 2018 San Diego, CA, USA**

**AWARDED TO**

Binod B. Sharma

**THIS CERTIFICATE OF ATTENDANCE IS AWARDED TO THE ABOVE NAMED INDIVIDUAL FOR ATTENDANCE AT THE 65th ANNUAL SCIENTIFIC MEETING OF THE SOCIETY FOR REPRODUCTIVE INVESTIGATION**

**Sandy Davidge, PhD, 2017-2018 President**