

Maternal and neonatal mortality in Moi Teaching and Referral hospital in Kenya

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MSc, BSc**

**This thesis is submitted in fulfilment of the requirements
for the Degree of Doctor of Philosophy (Gender and
Health)**

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Statement of Originality

This thesis contains no material which has been accepted 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 in the text. I give consent to this copy of my thesis, when deposited in the University's Digital Repository, subject to the provisions of the Copyright Act 1968. **Unless an Embargo has been approved for a determined period.

Statement of Authorship

I hereby certify that this thesis is submitted in the form of a series of published papers of which I am a joint author. I have included as part of the thesis a written statement from each co-author; endorsed by the Faculty Assistant Dean (Research Training), attesting to my contribution to the joint publications.

Faith Yego

13/7/2015

Date

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List of publications included as part of the thesis

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Yego, F., DEste, C., Byles, J., Stewart Williams, J., Nyongesa, P. (2013). *Risk factors associated with maternal mortality in a tertiary hospital in Kenya*. *BMC Pregnancy and Childbirth* **14**:1, 38. doi:10.1186/1471-2393-14-38

Yego, F., DEste, C., Byles, J., Nyongesa, P., Stewart Williams, J (2014). *A case-control study of risk factors for fetal and early neonatal deaths in a tertiary hospital in Kenya*. *BMC Pregnancy and Childbirth* **14**:38.9 doi:10.1186/s12884-014-0389-8

List of manuscripts to be submitted

Yego, Byles, J., DEste, C., Stewart Williams, J. *Completeness of maternal and neonatal hospital records at a tertiary level hospital in Kenya*

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A retrospective review of maternal and early neonatal mortality at Moi Referral Hospital in Eldoret Kenya. Research Gender for Health and Ageing Conference in Newcastle Australia in 2011 (Poster Presentation)

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“Determinants of maternal and early neonatal mortality at MTRH” (Abstract ID: R-1-025).

Presented at the 8th Annual International Conference of Moi University in 2012 (Oral presentation)

Statement of collaboration

I hereby certify that the work embodied in this thesis has been done in collaboration with other researchers, or carried out in other institutions. I have included as part of the thesis a statement clearly outlining the extent of collaboration, with whom and under what auspices.

As author of this thesis I conducted the work presented under the supervision of three supervisors: Professors Catherine D'Este and Julie Byles and Dr. Jennifer Stewart Williams

Dr. Paul Nyongesa and Dr. Wilson Aruasa were also instrumental advisors and contributed in some of the publications. I was a major contributor to all aspects of the study: planning, literature review, data collection, analysis and statistical modeling, interpretation of results, writing of manuscripts for peer-reviewed journals and writing of thesis.

Faith Yego

13/7/2015

Date

Dedication

I dedicate this thesis to all women who have died as a result of childbirth or lost a child during childbirth

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List of Abbreviations

ANC: Antenatal Care

APH: Antepartum Haemorrhage

BBA: Born Before Arrival

BP: Blood Pressure

EmOC: Emergency Obstetric Care

EMR: Electronic Medical Record

END: Early Neonatal Death

ENMR: Early Neonatal Mortality Rate

HDU: High Dependency Unit

HIV: Human Immunodeficiency Virus

HREC: Human Research Ethics Committee

ICD: International Classification of Disease

ICU: Intensive Care Unit

IREC: Institutional Research Ethics Committee

KNH: Kenyatta National Hospital

LND: Late Neonatal Death

MDGs: Millennium Development Goals

MMR: Maternal Mortality Rate

MMR: Maternal Mortality Ratio

MOH: Ministry of Health

MTRH: Moi Teaching and Referral Hospital

NMR: Neonatal Mortality Rate

NMR: Neonatal mortality Ratio

NBU: Newborn Unit

PAC: Post Abortal Care

PE: Preeclampsia

PPH: Postpartum Haemorrhage

PROM: Premature rupture of membranes

RA: Research Assistants

RAMOS: Reproductive Age Mortality Survey

RDS: Respiratory Distress Syndrome

SMI: Safe Motherhood Initiative

UN: United Nations

WHO: World Health Organization

Synopsis

The idea for this thesis originated while I was attending weekly mortality meetings at the Moi Teaching and Referral Hospital (MTRH) coupled with high maternal and neonatal mortality rates in Kenya. I shared the idea with two obstetricians who provided their support and willingness to help understand the problem. With support from the University of Newcastle and The Ministry of State for Public Service in Kenya, I received a scholarship to undertake my PhD at the University of Newcastle in Australia.

This thesis by publication is composed of seven chapters including: an introduction, methodology, four papers (each a separate chapter), and conclusion. All papers relate to factors surrounding maternal and neonatal mortality at a tertiary hospital in Kenya. At the time of submission three papers have been published and one is under review.

The first paper is a retrospective review of the incidence of maternal and neonatal mortality at MTRH and a description of characteristics of maternal and neonatal deaths at this hospital. The study identifies a range of socio demographic, clinical and health system factors as possible contributors to high maternal and neonatal mortality in Kenya. This paper was published in the Reproductive Health Journal.

The second paper is a case-control study following a manual review of maternal records at MTRH. The study identified antenatal care and maternal education as risk factors for maternal mortality at MTRH. This paper was published in BMC Pregnancy and Childbirth.

Paper Three is a case-control study of neonatal records at MTRH. Results showed that some risk factors for early neonatal mortality included: number of antenatal visits, gestational age, qualification of birth attendant, mother's complication at birth, and low Apgar scores at five minutes, and congenital malformations. This paper has been published in BMC Pregnancy and Childbirth.

The fourth paper presents an assessment of completeness of maternity data at MTRH including factors associated with missing data. The results showed that a range of maternal neonatal and health system factors were associated with missing data in the maternal and neonatal sample. This paper will be submitted for publication in a reputable journal.

The support I received from my supervisors was overwhelming in terms of making the project more realistic. We prepared all the necessary documents and obtained necessary approvals and permission to undertake the study. I personally was involved in the data collection process which was the bulk of this thesis because we had to go through paper records to obtain data for this study. I also did the data analysis with the guidance of my supervisors.

The outcomes of this study have had a huge audience globally as well as health system policy implications for the hospital and nationally. More specifically, one of the obstetricians in the hospital who was the study advisor (PN) had this to say about the study. "This study has had an impact in more revision and development of new protocols in the maternity unit on pre-eclampsia, triage of patients at admission, involvement of paediatricians in management of newborns, establishment of High

Dependence Unit (HDU) in addition to the existing Intensive Care Unit (ICU), involvement of physicians in management of medical disorders in pregnancy and increased staffing of labour ward with more doctors. More population based studies of the same are underway to help clarify the study findings”.

Thesis Overview

This thesis by publication contains an introduction; a chapter providing an overview of maternal and neonatal mortality including burden of disease, causes of and risk factors for mortality, and a conceptual framework for the thesis; a methods chapter; four papers and a conclusion chapter. The four papers focus on findings on maternal and neonatal mortality at the Moi Teaching and Referral Hospital (MTRH) in Kenya from 2004-2011. The papers are based on data collected from the maternity ward records at this hospital. Chapter Four presents the first of the journal articles (Paper One) which describes incidence and characteristics associated with maternal and neonatal mortality at MTRH. Paper Two presents a case-control study to examine risk factors associated with maternal mortality. A case-control study examining factors associated with fetal and early neonatal mortality at MTRH is provided in Paper Three. The final paper examines record completeness at MTRH and factors associated with missing data. The final chapter (Chapter 8) provides an overall conclusion to the work, discussing the directions for future research, study strengths and limitations. The appendices contain the publications, statements of contribution of authorship, study questionnaire, ethics approval, and a letter from MTRH.