

# **Lifestyle Risk Factors and Lifestyle Risk Management in People with Psychosis**

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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 and any approved embargo.

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## Thesis by publication

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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## Personal and Research Skills Developed During the PhD Candidature

The journey of my PhD candidature has been fulfilling, equipping me with skills that have increased my employability and led to my own personal growth.

My skills as a researcher have developed immensely through:

- Using varied research approaches including systematic review of literature, conducting research interviews, and qualitative and quantitative analysis of data.
- Learning to use variable research software during my candidature such as SPSS, STATA and Nvivo.
- Collating and presenting research findings in different forums that comprised national and international conference presentations, and internationally peer-reviewed journals.

My ability to problem solve has been consistently challenged during the course of my candidature, which has allowed me to think creatively. I demonstrated this by:

- Adopting new research methodology like the network meta-analysis, when seeking solutions for the various research questions.
- Finding and adopting solutions to concerns raised by research ethics committees and research reviewers.
- Forming professional relationships with people at the site where I conducted my research, to educate myself about the best ways to conduct various research processes during data collection.

My written communication has also seen extensive improvement, especially with regard to the use of objective language and synthesis of research findings. This was evidenced by:

- Authoring 6 peer-reviewed publications in the course of my PhD. Five of these have been accepted for publication.
- Participating in the ethics application process and obtaining approval for research.

My oral communication has also been developed though engaging in:

- Two oral presentations and two poster presentations at national and international discipline-related research conferences.
- Presentation of my research to university peers and mentors, to members of a local community managed organisation, and to staff at a local hospital.

My PhD journey has also provided opportunities to work with others who include my supervisors, study participants and co-authors. The effectiveness of this team-work and collaboration was proven by:

- Learning and successfully implementing two new research techniques by working remotely with mentors from Thailand and South Australia, leading to the co-production of peer-reviewed publications.
- Successful completion of data collection at the knowledge translation case study site. This required me to work together with participants and staff, with whom I maintained good relationships by ensuring I was reliable and looked out for the best interests of all who were involved.
- Producing peer-reviewed research publications that met the expectations of all the team members, based on feedback that was provided.

Receiving feedback on my work has also opened me up to new ways of thinking and has made me realise the value of seeking the views of those more experienced than myself, especially when working on projects. Incorporating feedback from others has definitely improved the overall quality of my thesis.

My initiative and leadership have expanded during my PhD. Successful completion has required me to take charge of all aspects of the research. This was demonstrated by:

- Approaching collaborators with specific expertise, for the purpose of working together on certain manuscripts.
- Advocating the importance of my research at the site where I collected my data.
- Following up co-authors and research participants with regard to completion of projects and participation in projects.
- Proposing timelines and direction for research projects, and maintaining accountability for this by reporting to my supervisors and other collaborators.

I have also had to maintain adequate planning and organisation during the course of my research. These skills were displayed by:

- Concurrently conducting multiple research projects, to ensure that the research work load was completed in a timely manner (3.5 years).
- Outlining short-term and long-term goals during the course of my research, and conveying this to the University's auditing systems so that accountability was maintained.



- Budgeting for research expenses, covered by Research Training Program government funding allocations, provided to each research higher degree candidate at the discretion of their Faculty and School.

Finally, I have had to adopt a teachable attitude, as many of the opportunities afforded to me during my PhD were new and required me to step away from fear of failure and learn new skills in the process.

## Table of Contents

List of Tables and Figures .....	12
Common Acronyms and Abbreviations in the Thesis .....	13
Common Symbols used in the Thesis .....	14
Abstract and Scope of the Thesis.....	15
Chapter 1: Background .....	19
1.1: Psychosis .....	19
1.2: Psychosis in Australia .....	19
1.3: Psychosis Onset.....	21
1.4: Impact and Burden of Psychosis .....	21
1.5: Treatment Pathway for People with Psychosis .....	22
1.5.1: The National Disability Insurance Scheme.....	25
1.6: Physical Health in People with Psychosis.....	26
1.7: Cardiovascular Disease in People with Psychosis .....	26
1.7.1: Modifiable Risk factors for Cardiovascular Disease in People with Psychosis.....	27
1.7.1.1: Metabolic Syndrome.....	27
1.7.1.2: Type 2 Diabetes/Diabetes Mellitus.....	28
1.7.1.3: Overweight and Obesity .....	29
1.7.1.4: Poor Nutrition/Diet.....	29
1.7.1.5: Physical Activity .....	32
1.7.1.6: Smoking.....	33
1.7.1.7: Alcohol .....	34
1.7.2: Co-occurrence or Clustering of Cardiovascular Disease Lifestyle Risk Factors.....	35
1.7.3: Other Factors Contributing to Cardiovascular Disease Risk in People with Psychosis .....	36
1.7.3.1: Antipsychotic Medications.....	36
1.7.3.2: Inequalities in Health Care.....	37
1.7.3.3: Genetics .....	38
1.8: Commonly used Interventions for Elevated Cardio Metabolic and Lifestyle Risk in People with Psychosis .....	38
1.8.1: Pharmacology .....	38
1.8.2: Non-pharmacological Interventions .....	39
1.8.2.1: Research Trials .....	40
1.9: The Current Situation on Management of Cardio Metabolic and Lifestyle Risk for Australians with Psychosis .....	42
1.10: Translating Knowledge from Research Trials.....	43
1.11: Summary .....	45

Chapter 2: Literature Gaps, Thesis Outline and Publications .....	47
2.1: Literature Gaps Addressed in this PhD .....	47
2.2: Thesis Outline .....	51
2.3: Publications in this Thesis .....	52
2.3.1: Manuscripts Published in Peer-Reviewed Journals .....	52
2.3.2: Manuscripts Currently Under Review in Peer-Reviewed Journals .....	52
Chapter 3: Cardiovascular Disease Lifestyle Risk Factors in People with Psychosis: A Cross-sectional Study .....	53
3.1: Study Overview .....	53
Chapter 4: Self-Reported Nutrition and Physical Activity Program Utilisation among Australians with Psychosis: A Cross-sectional Analysis of Data .....	68
4.1: Study Overview .....	68
Chapter 5.1: Comparative Efficacy of Lifestyle Intervention Strategies that Target Weight Outcomes in People with Psychosis: A Systematic Review and Network Meta-analysis .....	83
5.1.1: Study Overview .....	83
Chapter 5.2: An Appraisal of Methodology Reporting in Lifestyle Interventions among People with Psychosis using the CONSORT Statement for Randomised Trials of Nonpharmacologic Treatments: A Systematic Review .....	171
5.2.1 Study Overview .....	171
Chapter 6: Factors to Consider During the Implementation of Nutrition and Physical Activity Trials for People with Psychosis into an Australian Community Setting .....	185
6.1 Study Overview .....	185
Chapter 7: Discussion, Recommendations for Future Research and Concluding Thoughts.....	205
Overview .....	205
7.1: Discussion .....	206
7.1.1: Cardiovascular Disease Lifestyle Risk Factors in People with Psychosis: A Cross-sectional Study (Chapter 3) .....	206
7.1.2: Self-Reported Nutrition and Physical Activity Program Utilisation among Australians with Psychosis: A Cross-sectional Analysis of Data (Chapter 4).....	207
7.1.3: Comparative Efficacy of Lifestyle Intervention Strategies that Target Weight Outcomes in People with Psychosis: A Systematic Review and Network Meta-analysis (Chapter 5.1) .....	209
7.1.4: An Appraisal of Methodology Reporting in Lifestyle Interventions among People with Psychosis: A Systematic Review (Chapter 5.2).....	211
7.1.5: Factors to Consider During the Implementation of Nutrition and Physical Activity Trials for People with Psychosis into an Australian Community Setting (Chapter 6) .....	212
7.2: Recommendations for Future Research .....	213
7.3: Concluding Thoughts .....	215
References .....	216

Appendices.....	232
Appendix 1: Statement of Contribution and Collaboration for Chapter 3 .....	232
Appendix 2: Statement of Contribution and Collaboration for Chapter 4 .....	233
Appendix 3: Statement of Contribution and Collaboration for Chapter 5.1 Paper 1 .....	234
Appendix 4: Statement of Contribution and Collaboration for Chapter 5.1 Paper 2 .....	235
Appendix 5: Statement of Contribution and Collaboration for Chapter 5.2 .....	236
Appendix 6: Statement of Contribution and Collaboration for Chapter 6 .....	237
Appendix 7: Organisational Consent Form for Chapter 6.....	238
Appendix 7: Permission Form to Contact Consumers in Chapter 6.....	240
Appendix 8: Consent Form for Consumers in Chapter 6 .....	241
Appendix 9: Consent Form for Staff in Chapter 6.....	243
Appendix 10: Participant Information Statement for Chapter 6 .....	245
Appendix 11: Interview Protocol for Consumers in Chapter 6 .....	249
Appendix 12: Interview Protocol for Staff in Chapter 6.....	252
Appendix 13: Interview Protocol for Manager in Chapter 6.....	255
Appendix 14: CONSORT Statement for Randomized Trials of Nonpharmacologic Treatments: A 2017 Update and a CONSORT Extension for Nonpharmacologic Trial Abstracts .....	258

## List of Tables and Figures

Table of Contents.....	10
Figure 1: Australian Catchment Sites for the Survey of High Impact Psychosis <sup>(12)</sup> .....	21
Table 1: A Summary of Mental Health Care Accessed by People with Mental Illness in Australia <sup>(23)</sup> .	24
Table 2: The Evidence-base on Dietary Intake in People with Psychosis .....	31
Figure 2: A Figure Summarising Key Concepts from the I-PARIHS Knowledge Translation Framework. .....	45

## Common Acronyms and Abbreviations in the Thesis

ADGs	Australian Dietary Guidelines
BMI	Body Mass Index
CVD	Cardiovascular Disease
cm	Centimetres
CMO	Community Managed Organisation
CI	Confidence Interval
CONSORT	Consolidated Standards of Reporting Trials
CHD	Coronary Heart Disease
ES	Effect Size
GP	General Practitioner(s)
g	Gram
HR	Hazard Ratio
HDL	High-Density Lipoprotein
h	Hour
HIV/AIDS	Human Immunodeficiency Virus Infection and Acquired Immune Deficiency Syndrome
IDF	International Diabetes Federation
i-PARIHS	Integrated Promoting Action on Research Implementation in Health Systems
ICD	International Classification of Diseases
kg	Kilogram
kg/m <sup>2</sup>	Kilogram per square metre
kJ	Kilojoules
Km <sup>2</sup>	Square Kilometre
LPPDS	Low Prevalence (Psychotic) Disorders Study
LDL	Low-density Lipoprotein
MET	Metabolic Equivalent
MetS	Metabolic Syndrome
uIU/mL	Micro-international Unit per Millilitre
mg/dL	Milligrams per Decilitre
mmHg	Millimetres of Mercury
mmol/L	Millimoles per Litre
min	Minute
MI	Myocardial Infarction
NDIA	National Disability Insurance Agency
NDIS	National Disability Insurance Scheme
NHMRC	National Health and Medical Research Council
NSW	New South Wales
OR	Odds Ratio
PAD	Peripheral Arterial Disease
RCTs	Randomised Controlled Trials
RR	Relative Risk
n	Sample
SD	Standard Deviation
SMR	Standardised Mortality Ratio
SHIP	Survey of High Impact Psychosis
WMD	Weighted Mean difference

YLDs	Years of Life Lived with Disability
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## Common Symbols used in the Thesis

<	Less than
>	Greater than
≤	Less than or equal to
≥	Greater than or equal to
=	Equal to
%	Percent

## Abstract and Scope of the Thesis

The research presented in this thesis primarily focused on people with psychosis, however, reference has been made to people with other mental illnesses with similar socioeconomic, cognitive, clinical and functioning profiles (1). Lifestyle risk and lifestyle risk management in people with psychosis were investigated, with a primary emphasis on nutrition and physical activity behaviour, however smoking was also explored in one study. These three risk factors are collectively known as lifestyle risk factors and are the primary downstream factors that contribute to modifiable cardiovascular disease (CVD) risk.

The first component of the research focused on the relationship between these lifestyle risk factors with modifiable CVD risk factors (dyslipidaemia, hypertension and hyperglycaemia) and potential confounders, to reveal the contributing factors of excess CVD risk in people with psychosis. The patterns of lifestyle risk factor co-occurrence or clustering were also assessed to enable the tailored design of interventions for this population.

Interventions with a focus on lifestyle risk management for people with psychosis were examined as part of the research; this included programs available in the community setting and existing research trials. Review of literature highlighted a knowledge gap on the utilisation and effects of attending Australian community nutrition and physical activity programs for people with psychosis. Moreover, strategies that contributed to the efficacy of lifestyle intervention research trials had not been clearly identified and these trials did not show evidence for translation into the Australian community setting following research completion; therefore, the issues that affected intervention translation into Australian practice settings were unknown.

International data from people experiencing psychosis and other mental illness was cited in the consideration of these topics. Epidemiological data from the Australian context was primarily from the Second Australian National Survey of Psychosis, known as Survey of High Impact Psychosis (SHIP), which was conducted in 2010, with 1,825 participants (2). Data from SHIP were analysed for two of the four studies included in this thesis.

*The first study from SHIP aimed to:*

- Describe the relationship between lifestyle risk factors for CVD (nutrition, physical activity, and smoking) and dyslipidaemia, hypertension and hyperglycaemia, while controlling for potential confounders.
- Identify clustering patterns of lifestyle risk factors in study participants and describe demographic characteristics associated with different clusters of lifestyle risk factors.

Results of the analyses between lifestyle risk factors with dyslipidaemia, hypertension and hyperglycaemia, were generally not reflective of patterns found in the general population, even after adjusting for clozapine use, sex and age. Although trained investigators applied valid and reliable research tools, SHIP was not a longitudinal study, which is a more appropriate design to elucidate the relationships that were investigated. Moreover, tools used to assess nutrition, physical activity and smoking relied on self-report and did not obtain broad research data, which could have impacted findings. Prospective longitudinal studies could add to current work by improving upon the issues that affected the research, along with pinpointing additional confounding variables that contribute to excess CVD.

This study also found that clustered occurrence of the three lifestyle risk factors was associated with certain demographic variables. Persons with the greatest co-occurrence of all three lifestyle risk factors were younger; males; those lacking tertiary qualifications; and people relying on pensions for income ( $p<0.05$ ). Additionally, samples with a mixed demographic profile across age, gender, education attainment, and financial situation primarily showed risk of poor nutrition (inadequate fruit and vegetable intake) and inadequate physical activity ( $p<0.05$ ). Finally, those most likely to present with nutrition that was consistent with guidelines (fruit and vegetable), the highest physical activity and non-smoking behaviour ( $p<0.05$ ), were women; people with tertiary qualifications; persons less likely to rely on government pensions; and those who were older ( $p<0.05$ ). Consideration of how lifestyle risk factors cluster in the design of lifestyle interventions for people with psychosis will enhance program quality, because the risk factors targeted and advice provided will be adapted to meet participant needs.

*The second study from SHIP aimed to:*

- Describe the self-reported attendance of community nutrition and physical activity programs in the government and non-government sector, and identify demographics associated with overall self-reported program attendance.
- Assess whether improved nutrition and physical activity outcomes were associated with program attendance.

Program participation was only 5.3% in the government sector and 8.7% in the non-government sector. The overall attendance of programs had a significant relationship with participant diagnosis, and was positively associated with education qualifications ( $p<0.05$ ). The low utilisation of programs could be increased by following the relevant Royal Australian and New Zealand College of Psychiatrists (RANZCP) guidelines for physical health management, and advocacy efforts by front-line health professionals like general practitioners and case managers. Additionally, personal challenges that



inhibit service access (like low education attainment or capacity) should be addressed to mitigate some of the vulnerability that is experienced by this group. Inadequate evidence on distinct nutrition and physical activity benefits associated with program utilisation, creates a case for further evaluation of these services, to ensure that optimal outcomes are achieved.

The research component focusing on lifestyle intervention research trials, comprised of 2 main papers.

*The first paper was a systematic review and network meta-analysis which aimed to:*

- Pool and rank the efficacy of lifestyle intervention strategies that target weight, body mass index (BMI), waist-circumference and waist-to-hip ratio in people with psychosis, by comparing the effect size on these weight outcomes.
- Stratify lifestyle interventions according to their inclusion of dietary information that adheres to Australian Dietary Guidelines (ADGs).

The application of education, tailored advice or goal setting, and progress review, in both dietary and physical activity components of lifestyle interventions, produced the greatest decreases in weight (ES = -4.12, 95% CI=-7.772 to -2.760,  $p<0.000$ ) and BMI (ES = -2.94, 95% CI=-1.78 to -0.357,  $p=0.003$ ). Other essential intervention components that contributed to positive results were food and physical activity records, and supervised exercise. Inadequate reporting of waist circumference and waist-to-hip ratio outcomes limited generation of conclusions for these outcomes. Quality of the systematic review findings based on GRADE (Grading of Recommendations Assessment, Development and Evaluation) criteria ranged from low to very low. This was due to limitations in primary research studies that increased the risk of biased findings. The appraisal of dietary advice in lifestyle interventions using the ADGs generally showed compliance of studies, however, appraisals were (in some cases) hindered by vague and insufficient reporting in original research trials. Appropriate dietary approaches or advice for people with psychosis was therefore not identified in the study.

*In light of poor reporting in lifestyle intervention trials, the second paper from the systematic review aimed to:*

- Critically appraise lifestyle intervention studies that target weight outcomes for people with psychosis, against the methods component of the Consolidated Standards of Reporting Trials (CONSORT) statement for randomised trials of nonpharmacologic treatments.

Low utility of reporting guidelines in lifestyle interventions for people with psychosis was highlighted. This was evidenced by less than 50% of studies fulfilling reporting criteria for trial design, participants, interventions, outcomes, sample size, randomisation, blinding and statistical methods. Findings underline the vital importance of employing the CONSORT statement or similar guidelines to ensure

that research reporting meets the quality standards that safeguard consistency and comprehensiveness. This will increase the usability of information from existing clinical trials, which will enhance the likelihood of people with psychosis benefiting from the research.

*The final component of the research was a qualitative study, conducted using semi-structured interviews in the context of a local Australian Community Managed Organisation (CMO) that delivers programs to people with mental illness. The study aimed to:*

- Identify the factors that affect program access from the perspectives of both consumers and staff.
- Describe the elements that impact on program delivery from the perspective of staff.

This study was designed to pinpoint issues that are likely to affect translation of lifestyle interventions into CMOs. Study aims and interview questions were based on implementation concepts highlighted in the “Integrated Promoting Action on Research Implementation in Health Systems” (i-PARIHS) knowledge translation framework. Themes on factors that affected program access (based on consumer and staff perspective) were (1) consumer financial status, domestic responsibilities, and health; (2) the design and delivery of programs; (3) structure and practices of the organisation; (4) attitude, skills and effort of staff involved in program delivery; and (5) social connections and stigma experienced by consumers during program access. Program delivery was influenced by consumer attendance and interest in prospective programs, availability and restrictions to the use of funding, as well as the organisational structure and practices. Further examination of the concerns which shaped program access and delivery revealed that most barriers could be managed through efforts from the CMO; therefore, alleviating the effect of these factors during prospective translation of lifestyle interventions into this setting may promote efficiency and decrease resistance to the process.

The body of work presented in this thesis provides insight on the occurrence of lifestyle risk factors, specifically nutrition and physical activity behaviour, and the different interventions that are available for people with psychosis. The application of validated tools and processes for the synthesis of evidence enhances the quality and usability of findings by other parties. In addition, consideration of issues pertinent to prospective knowledge translation aims to inspire implementation of best-practice evidence, and maximise impact of research efforts in this field.