

**Nurse-Led Behaviour Change Interventions to
Improve Medication Adherence in Patients with
Cardiovascular Disease**

By

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This thesis is submitted for the Degree of Doctor of Philosophy^[SEP] of University
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Declaration of Original Authorship

I, **Ali Hussein Alek Al-Ganmi** declare that this thesis, is submitted in fulfilment of the requirements for the award of Doctor of Philosophy-Adult Nursing, in the Faculty of Health at the University of Technology Sydney. This thesis is wholly my own work unless otherwise reference or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis. This document has not been submitted for qualifications at any other academic institution. This research is supported by the Australian Government Research Training Program.

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Date of submission

24-February-2020

Dedication



In the name of Allah the merciful, and prayer and peace upon the best of his creatures.

I dedicate this dissertation to my family that have granted me the continuous support throughout the entire PhD journey. I dedicate this dissertation to the cardiac patients that have granted me the privilege of sharing their experiences with taking cardiac medications and their stories about their life over the past two years. They have become my teachers-each one of them a true hero – surely, we have walked together on sacred ground.

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Overview of the Thesis

This thesis is presented in seven chapters. Some of these chapters are based on publications that are either under review or under consideration for publication in peer-reviewed journals.

Chapter One: This is the introduction chapter of this thesis. This chapter outlines the background, rationale and outcomes for this study along with the significance and research questions under study.

Chapter Two: This chapter presents a systematic review of randomised controlled trial studies describing the best available evidence on the effectiveness of interventions suitable for delivery by nurses, designed to enhance cardiac patients' adherence to their prescribed medications. This chapter is based on a published paper: (Al-Ganmi et al. 2016).

Chapter Three: This chapter presents survey results determine and compare the level of adherence to cardiac medications and factors predictive of medication adherence in patients with cardiovascular disease admitted to a cardiac ward or attending cardiac rehabilitation in Australia. This chapter is based on a revised version of the second paper was submitted to the *Journal of Nursing and Health Sciences*: Al-Ganmi A., Perry L., Gholizadeh L., & Alotaibi A., (2019) Medication adherence and predictive factors in patients with cardiovascular disease in Australia. Revised version submitted to *Journal of Nursing and Health Sciences*.

Chapter Four: This chapter presents the findings of the multi-centre comparison study evaluated and compared adherence to cardiac medications and potentially predictive factors based on the Theory of Planned Behaviour (TPB) in patients with cardiovascular disease admitted to hospital and attending cardiac services in Australia and Iraq. This chapter is based on a paper published in *Collegian*: (Al-Ganmi et al. 2019).

Chapter Five: This chapter presents the proposed protocol, designed to pilot an RCT as a suitable test of the effectiveness of an evidence-based, nurse-led intervention in promoting of medication adherence. This chapter is based on a published paper: (Al-Ganmi et al. 2018).

Chapter Six: This chapter presents the overall discussion of the main findings of the two surveys of this study and wraps up the findings of this thesis in relation to its strengths and limitations.

Chapter Seven: This chapter presents the conclusions of this study and sets out the implications of this work and makes recommendations for, clinical practice, education, policy, and future research.

List of Abbreviations

ABS	Australian Bureau of Statistics
ACE	Angiotensin-Converting-Enzyme (ACE) Inhibitors
ACS	Acute Coronary Syndrome
AHA	American Heart Association
AIHW	Australian Institute of Health and Welfare
ARMS	Ability to Refill Medication Scale
BaMQ	Belief about Medication Questionnaire
CAD	Coronary Artery Disease
CR	Cardiac Rehabilitation
CCB	Calcium Channel Blockers
CHD	Coronary Heart Disease
CNC	Clinical Nurse Consultant
CVD	Cardiovascular Disease
ED	Emergency Department
IHD	Ischaemic Heart Disease
MAQ	Medication Adherence Questionnaire
MASES-R	Medication Adherence Self-Efficacy Scale-Revised
MI	Myocardial Infraction
MINT	Motivational Interviewing
MOH	Ministry of Health
NHMRC	Australian National Health & Medical Research
MSSS	Medications Social Support Scale
PBS	Australian Pharmaceutical Benefit Scheme
POWH	Prince of Wales Hospital
PDC	Proportion of Day Covered
RCT	Randomised Controlled Trial
TM	Text Message
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation

Keywords

1. Medication Adherence
2. Medication non-Adherence
3. Cardiovascular Disease
4. Predictive Factors
5. Australia
6. Iraq
7. Cardiology
8. Cardiac Nursing
9. Medication Refill
10. Medication Self-Administration
11. Beliefs about Medication
12. Culture
13. Theory of Planned Behaviour
14. Cardiac Rehabilitation
15. Rehabilitation Nursing
16. Self-Efficacy
17. Social Support
18. Cardio-protective
19. Education
20. Motivational Interviewing
21. Nurse-Led Intervention
22. Nursing
23. Text Message
24. Randomised Control Trial
25. Pilot

Conference Papers and Publications Arising from the Thesis

Al-Ganmi A.H., Perry, L., Gholizadeh, L. & Alotaibi A.M. (2016). Cardiovascular medication adherence among patients with cardiac disease: a systematic review. *Journal of advanced Nursing*, 72, 3001–3014. .

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Al-Ganmi A.H., Perry, L., Gholizadeh, L. & Alotaibi A.M. (2018). Behaviour change interventions to improve medication adherence inpatients with cardiac disease: Protocol for a mixed methods study including a pilot randomised controlled trial. *Collegian*, 25, 385–394.

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Definition of Terms for this thesis

Adherence

The extent to which the patient's behaviour matches agreed recommendations by the prescriber (Horne et al. 2005).

Adherence (Operational Definition)

The extent to which a patient takes prescribed medications according to the dosage and frequency recommended by the provider (Vrijens et al. 2012).

Medication Adherence

The extent to which a person's behaviour (taking medications, following a recommended diet and/or executing lifestyle changes) corresponds with the agreed recommendations of a healthcare provider' (Sabaté 2003).

Health Behaviour:

An action taken by a person to maintain, attain, or regain good health and to prevent illness. Health behaviour reflects a person's health beliefs (Mosby's Medical Dictionary 2009).

Behaviour Change

A broad range of activities and approaches which focus on the individual, community, and environmental influences on behaviour (Stedman's Medical Dictionary for the Health Professions and Nursing - Australia/New Zealand Edition 2005).

Cardiac Disease

A structural or functional abnormality of the heart, or of the blood vessels supplying the heart, that impairs its normal functioning (The American Heritage Medical Dictionary 2007).

Cardiovascular Disease (CVD)

Any disease that affects the cardiovascular system, principally cardiac disease, vascular disease of the brain and kidney, and peripheral arterial disease (Fuster & Kelly 2010).

Coronary artery disease (CAD), Coronary Heart Disease (CHD), or Ischaemic Heart Disease (IHD)

Narrowing of the lumen of one or more of the coronary arteries, usually due to atherosclerosis; leading to angina pectoris, myocardial infarction or congestive heart failure (Stedman 2005).

Acute Coronary Syndrome (ACS)

A classification encompassing clinical presentations ranging from unstable angina through myocardial infarctions not characterised by alteration in Q waves. The classification sometimes also includes myocardial infarctions characterised by altered Q waves (Mosby's Medical Dictionary 2009).

Self-Efficacy

A person's estimate or personal judgment of his or her own ability to succeed in reaching a specific goal, for example continuing at a prescribed weight level (Farlex Partner Medical Dictionary 2012).

Abstract

Introduction: Cardiovascular disease (CVD) is the leading cause of mortality worldwide, with medication non-adherence a suboptimal, poorly prioritised and challenging health problem in both developed and developing nations. Treatment of CVD for most patients comprises lifelong lifestyle changes and regular medication. Adherence to recommended treatment can be promoted by nurse-led interventions.

Aim: The overarching aims of this thesis were to develop a widely-applicable, evidence-based nurse-led intervention tailored to address factors predictive of poor adherence to medication regimes in patients with CVD who had been admitted to an acute hospital as an acute cardiac care or those who attend cardiac rehabilitation, and to design a protocol to trial this intervention. Objectives were:

Paper 1: To critically appraise and synthesise the best available evidence on the effectiveness of interventions suitable for delivery by nurses, designed to enhance cardiac patients' adherence to their prescribed medications.

Paper 2: To identify factors predictive of medication adherence in patients with cardiovascular disease admitted or attending hospital in Australia.

Paper 3: To compare factors associated with medication non-adherence in patients with CVD in developed and developing nations (Australia and Iraq).

Paper 4: To design a protocol suitable to test the effectiveness of an evidence-based nurse-led intervention in promotion of medication adherence in patients with CVD who admit to in-patient for acute cardiac care or those who attend cardiac rehabilitation.

Methods: Using established methods, a systematic review was conducted to identify effective nurse-led medication adherence interventions for patients with CVD. Cross-

sectional surveys were conducted with 120 and 126 patients with CVD who were inpatients of a cardiac ward or attending cardiac out-patient care in acute tertiary hospitals in Sydney, Australia and Baghdad, Iraq, respectively. Medication adherence was assessed using the Medication Adherence Questionnaire; factors potentially predictive of medication non-adherence were assessed using validated instruments and modelled using regression analysis. A pilot randomised controlled trial was proposed to test the hypothesis that a theory-based, nurse-led, multi-faceted intervention comprising motivational interviewing techniques and text message reminders can enhance medication adherence in cardiac patients compared to standard care alone.

Results: Systematic review findings suggested that nurse-led interventions applying motivational interviewing and text messaging offer most promise. In the Australian study, participants from cardiac rehabilitation reported significantly lower adherence than ward in-patients. The comparative study showed significantly poorer adherence to cardiac medications in Iraqi than Australian patients. The ability to correctly self-administer and refill medications, and beliefs about medications, independently predicted cardiac medication adherence behaviour in both countries.

Conclusion: Nurse-led interventions that incorporate elements of motivational interviewing plus text messaging have the potential to improve medication adherence of patients with CVD through targeting patients' ability to self-administer and refill medications and their beliefs about these medications.