Factors that Influence South Asian Cardiac Patients’ Medication Adherence

by

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Abstract

South Asians experience high rates of cardiovascular disease. Medications are a major component of chronic disease management. A systematic literature review revealed factors that contributed to medication non-adherence with South Asians. Content analysis strategies were used for the synthesis. Thirteen papers were in the final set with medication side-effects, cost, forgetfulness and language barriers contributing to non-adherence. Inconsistent methodologies and scant information on immigrant factors within the Canadian context led to further exploration.

An ethnographic study was conducted between January to September 2012. Observations and interviews were conducted with South Asian cardiac patients, as well as physicians, pharmacists and staff. Fieldnote and interview data were transcribed and analyzed using ethnographic domains and cultural themes. South Asian cardiac patients relied on family members for instrumental support. Medication adherence was enhanced when relationships with healthcare professionals demonstrated clear communication and cultural awareness. Memory mechanisms need to be individualized and were generally ‘low technology’.
Acknowledgements

I want to extend my thanks to the Canadian Council of Cardiovascular Nurses for research funding to complete this project.
Dedication

I wish to thank my supervisor Dr. Kathryn King-Shier. She has guided me with expertise throughout my program, overcoming the many obstacles. Many hours have been spent mentoring me throughout the process of my thesis and my career. It has been an honour to collaborate with you!

To my committee, Dr. Cydnee Seneviratne and Dr. Charlotte Jones, I appreciate your expertise and support throughout this process. As my research methods expert, Dr. Cydnee Seneviratne was an ongoing resource of knowledge and support. Dr. Charlotte Jones gave freely of her experiential knowledge and research expertise for my study.

I thank my husband, Paul, for his tireless dedication to our family during the last few years. Thanks for you ongoing encouragement and support. To my children, Alex, Erika and Luke, you make me smile! You have been the delight of my life! To my parents, Dan and Norma, thank you for your love and unwavering belief in me!

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Table of Contents

Abstract .......................................................................................................................... ii
Acknowledgements ........................................................................................................ iii
Dedication ....................................................................................................................... iv
Table of Contents .......................................................................................................... v
List of Abbreviations ..................................................................................................... vii

CHAPTER 1: INTRODUCTION .................................................................................. 1
  Coronary Artery Disease Management ..................................................................... 1
  South Asian Population in Canada ......................................................................... 2
  South Asians and CAD ......................................................................................... 2
  Adherence to Medications ..................................................................................... 3
  Medication Adherence among the South Asian Cardiac Population .................... 5
  Research Question .............................................................................................. 6

CHAPTER 2 ............................................................................................................... 7

CHAPTER 3: METHOD ............................................................................................. 49
  Ethnography ......................................................................................................... 49
  Design ..................................................................................................................... 50
  Sample .................................................................................................................... 51
  Data Collection ..................................................................................................... 52
    Obtaining Access to the Setting ........................................................................ 52
    Participant Observation ..................................................................................... 53
    Interviews ............................................................................................................ 54
    Translation .......................................................................................................... 56
    Transcription ....................................................................................................... 57
  Data Analysis ......................................................................................................... 57
  Ethical Considerations ........................................................................................... 58
  Limitations .............................................................................................................. 58

CHAPTER 4 ............................................................................................................... 60

CHAPTER 5: DISCUSSION ....................................................................................... 97
  The Literature Review .......................................................................................... 97
  The Ethnographic Study ...................................................................................... 100
  Dimensions of Medication Adherence ............................................................... 101
  Recommendations for Practice ........................................................................... 102
  Future Inquiries .................................................................................................... 104
  Conclusion .............................................................................................................. 105

REFERENCES ........................................................................................................... 106

APPENDIX A: LETTER OF SUPPORT ................................................................ 113
APPENDIX B PHYSICIAN CONSENT ................................................................. 115
APPENDIX C PATIENT CONSENT ............................................................... 119
APPENDIX D: PATIENT INTERVIEW CONSENT .......................................... 123
APPENDIX E: PHYSICIAN INTERVIEW CONSENT ...................................... 127
APPENDIX F: MORISKY MEDICATION ADHERENCE SCALE ..................... 130
APPENDIX G: INTERVIEW QUESTIONS ....................................................... 132
# List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1c</td>
<td>Glycated haemoglobin</td>
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<td>ACEI</td>
<td>Angiotensin converting enzyme inhibitors</td>
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<td>ACS</td>
<td>Acute coronary syndrome</td>
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<td>AMI</td>
<td>Acute myocardial infarction</td>
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<tr>
<td>BB</td>
<td>Beta-blockers</td>
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<td>CAD</td>
<td>Coronary artery disease</td>
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<tr>
<td>CAM</td>
<td>Complementary and alternative medicines</td>
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<tr>
<td>CCB</td>
<td>Calcium channel blockers</td>
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<td>CHF</td>
<td>Congestive heart failure</td>
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<td>CVD</td>
<td>Cardiovascular disease</td>
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<td>HIV</td>
<td>Human immunodeficiency virus</td>
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<td>HTN</td>
<td>Hypertension</td>
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<td>MI</td>
<td>Myocardial infarction</td>
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<td>MMAS</td>
<td>Morisky Medication Adherence Score</td>
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<td>WHO</td>
<td>World Health Organization</td>
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CHAPTER 1: INTRODUCTION

Cardiovascular disease (CVD), defined as coronary artery disease, myocardial infarction, congestive heart failure and cerebrovascular disease (Choi et al., 1999), is the leading cause of death in Canada and is largely preventable (Epstein, 1996). The costs associated with CVD, which include hospitalizations, medications, disability and premature death, exceed $200 billion per year in Canada (Wielgosz et al., 2009). Though, over the past forty years, CVD deaths have decreased by as much as 70% (Epstein, 1996), Canadians diagnosed with CVD need optimal treatment to enjoy a quality, lengthy life.

Coronary Artery Disease Management

Coronary artery disease (CAD) is a significant component of CVD (Wielgosz et al., 2009). Once a person has CAD (as manifested by acute coronary syndromes (ACS)-stable and unstable angina, myocardial infarction), preservation of heart function becomes the primary goal, with medication optimization and lifestyle modification playing major roles. The long-term management of CAD includes adhering to cardio-protective medications. Adherence to antiplatelet agents, beta blockers, statins and angiotensin converting enzyme (ACE) inhibitors or angiotensin reception blocking agents is associated with 20-30% reduction in morbidity and mortality following ACS (First International Study of Infarct Survival Collaborative Group, 1986; Heart Outcomes Prevention Evaluation Study Investigators, 2000; Heart Protection Collaborative Group, 2002; LIPID study group, 1998; The Scandinavian Simvastatin Survival Study Group, 1994; Tricoci et al., 2006). This important component of CAD care occurs, for the most part, in the community and is largely controlled by patients (patient self-managed) as opposed to healthcare providers. Culturally-based factors influence peoples’ health beliefs and their healthcare practices. Thus, healthcare providers must understand the factors that influence
(e.g., culture) patients’ health beliefs, to effectively prepare and assist patients as they manage their disease in their home communities.

**South Asian Population in Canada**

The South Asian population (e.g. those whose ancestry originates in India, Pakistan, Bangladesh or Sri Lanka) has grown quickly in Canada and is now the largest visible ethnic minority group (Chui, Tran, & Maheux, 2008). Calgary, one of Canada’s largest cities, is host to a sizable South Asian community; the third largest consolidated group in the country (Chui et al., 2008).

South Asians are a heterogeneous mix of different religions, languages, and immigration histories. The major religious groups are fairly equally divided between Sikhs, Hindus, and Muslims. The most common languages include: Punjabi, Hindi, Tamil, Urdu, and Gujarati (Chui et al., 2008). The immigration pattern from their country of origin may be direct or indirect, with stops in Tanzania, Fiji, Trinidad, Singapore or the United Kingdom prior to coming to Canada (Tran, 2005). The South Asian population on the whole, is more educated but has a lower income than the Canadian average (Chui et al., 2008).

**South Asians and CAD**

Studies published since 1960 have indicated a high rate of CAD among South Asians. There are little data available regarding CAD mortality rates from South Asian countries largely due to the limitations in compiling data. However, studies originating from other countries including Trinidad, Mauritius, Singapore, Great Britain and Canada have revealed that South Asian immigrants have higher rates of CVD, and CAD in particular, than their native populations (Anand et al., 2000; Danaraj, Acker, Danaraj, Ong, & Yam, 1959; Magliano et al., 2010; McKeigue & Marmot, 1989; Miller et al., 1989). British and Canadian researchers have
provided the largest collection of data regarding CVD in South Asians, indicating an incidence that is 1.5 times higher than the average population (Anand et al., 2000; Bhopal et al., 1999).

No single factor has been identified to explain the higher rate of CAD among South Asians but rather a multitude of factors are emerging (Anand et al., 2000; Bhopal et al., 1999; Joshi et al., 2007; McKeigue & Marmot, 1989). The INTERHEART study was the first of its kind to quantify that a group of modifiable risk factors could accurately predict the rate of CVD among South Asians, both in their native countries and as immigrants (Joshi et al., 2007; Yusuf et al., 2004). The increased prevalence of CVD (and CAD in particular) may be explained in part by higher rates of risk factors such as diabetes (Chaturvedi & Fuller, 1996; Forouhi, Sattar, Tillin, McKeigue, & Chaturvedi, 2006), insulin resistance (Misra, 2009), altered lipid profile (Bhalodkar et al., 2005; McKeigue et al., 1985), intra-abdominal obesity (Lovegrove, 2007), altered apolipoprotein B(100)/apolipoprotein A-1 ratio (Joshi et al., 2007), metabolic syndrome (Anand et al., 2003), and C-reactive protein (Anand et al., 2004). All of these risk factors can be mitigated through careful medical management.

**Adherence to Medications**

The most common approach for CAD is medical management. Medications prescribed for CAD are largely an ongoing lifetime commitment. The goal of taking medications becomes to preserve optimal heart function for as long as possible.

Adherence to medications may be as important to the health of a country as advancing medical technology (World Health Organization, 2003). The cost of failed adherence to cardiac medications in Canada is estimated at $7-9 billion (Choi et al., 1999). For example, one quarter of elderly hospital admissions are attributed to non-adherence of medications (Choi et al., 1999).
Thus, the cost of failed medication adherence is seen in both healthcare dollars and the faltering health of individuals.

The World Health Organization (WHO) (2003) describe 5 elements associated with medication adherence: (1) the healthcare team, as well as (2) socioeconomic- (3) therapy related- (4) patient related-, and (5) condition related-factors (2003). Baroletti & Dell’Orfano (2010), further divided patient-related factors related to medication adherence into three groups: communication barriers, socioeconomic reasons and motivation.

The definition of what constitutes adherence and how it is measured differs between studies, but generally adherence is measured as greater than 80% of medications consumed that are prescribed (World Health Organization, 2003). The method for measuring consumption ranges from self-report, monitoring the filling of prescriptions (either through drug databases or pill counts), to measurement of drug levels in the blood (Ho, Bryson, & Rumsfeld, 2009). Lack of medication adherence in cardiac patients has been estimated to be greater than 60% (Kravitz et al., 1993). Studies have revealed 50% of patients discontinuing antihypertensive medications within 6 months of a cardiac event (Newby et al., 2006) and only 40% of patients continuing with lipid lowering medication beyond two years after an acute coronary syndrome event (Jackevicius, Mamdani, & Tu, 2002).

People’s perceptions regarding their medications will affect their adherence. When comparing perceptions regarding diabetic and CAD medications among British people, CAD medications were identified as less important and lipid management medications as the least important of the group (Stack, Elliott, Noyce, & Bundy, 2008). People believed that medications for hypertension and dyslipidemia were unnecessary, since lifestyle could alter the need for them
(Stack et al., 2008). It is important to understand CAD patient’s perceptions regarding their medications to improve adherence.

**Medication Adherence among the South Asian Cardiac Population**

Using a British Columbia registry, Lai et al. (2008) examined patient adherence to secondary prevention medications after acute myocardial infarction in 9926 elderly patients and found that despite being prescribed secondary prevention therapies more often, adherence was worse in South Asians. For example, South Asians were less likely to adhere to ACE inhibitors (OR 0.78, 95% CI: 0.61-0.99; p=0.04) compared to Caucasian cardiac patients.

Given the high incidence of CAD in the South Asian population, it is imperative to understand the factors that influence adherence and non-adherence to cardiac medications. There has been little examination of the factors related to South Asian’s adherence or non-adherence to cardiac medications. Qualitatively, a study of South Asian patients after ACS also reported that they felt ‘over-medicated’ by their physicians (Webster, Thompson, & Mayou, 2002). In a study of South Asian’s use of diabetic medications, factors associated with increased adherence included a favourable opinion of the healthcare system (being reliable and unbiased) and medications that were of higher quality than back in India and Pakistan (Lawton, Ahmad, Hallowell, Hanna, & Douglas, 2005). Factors associated with decreased adherence included wanting to decrease the number of pills taken a day, stopping medications when symptoms disappeared and anxieties that long term medication regimes would negatively affect their health (Lawton et al., 2005).

South Asian’s may also have unique contexts when assessing their needs to adhere to a medication regiment. For example, a study of Bangladeshi diabetics in Britain revealed that they were eager to understand their illness, but did so by talking with and gaining explanations from
family and friends. Scientific explanations were not sought out. Using medications as a ‘preventative measure’ was difficult to grasp and medication was often stopped once symptoms resolved. This comes from a culturally bound belief that the body is attacked by an outside agent, rather than an organ failure from within. Also study participants believed that returning to Bangladesh would eliminate health problems due to the warmer weather (Greenhalgh, Helman, & Chowdhury, 1998).

Further research is needed to examine the factors influencing South Asian cardiac patients and their medication adherence, specifically in the context of Canada’s healthcare system. Only once these factors are identified, can successful interventions be implemented to improve medication adherence in this vulnerable group.

**Research Question**

What are the factors that influence South Asian people with coronary artery disease taking (or not) their cardiac medications?

This question brought about two studies. The first was a systematic literature review of the known factors of medication adherence among South Asian cardiac patients. The second was an ethnographic study based on the perspective of South Asian cardiac patients and what they perceived the factors for medication adherence were.
CHAPTER 2

Manuscript #1: Cardiac Medication Adherence among South Asians: Literature Review

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ABSTRACT

Aim. This paper is a report of a narrative review examining the current state of knowledge regarding adherence with cardiac medication among South Asian cardiac patients.

Background. South Asians experience higher rates of cardiovascular disease than any other ethnic group. South Asians may be less adherent with cardiac medication regimen than Caucasians. The factors contributing to adherence are important to discover to assist South Asians to optimize their cardiac health.

Data Sources. CINAHL, Medline (Ovid), PsychINFO, EMB Reviews-(Cochrane), and EMBASE were accessed using the key words: ‘South Asian’, ‘Asia’, ‘East India’, ‘India’, ‘Pakistan’, ‘Bangladesh’, ‘Sri Lanka’, ‘medication compliance’, ‘medication non-compliance’, and ‘medication adherence’. English language papers published from January 1980 to January 2013 were eligible for inclusion.

Review Methods. Abstracts were reviewed for redundancy and eligibility by the primary author. Manuscripts were then retrieved and reviewed for eligibility and validity by both authors. Content analysis strategies were used for the synthesis.

Results. Thirteen papers were in the final data set; most were conducted in India and Pakistan. Medication side-effects, cost, forgetfulness and higher frequency of dosing contributed to non-adherence. South Asian immigrants also faced language barriers, which contributed to non-adherence. Knowledge regarding the medications prescribed was a factor that increased adherence.
Conclusion. South Asians’ non-adherence to cardiac medications is multifaceted. How South Asians who newly immigrate to Western countries make decisions regarding their cardiac medication adherence, ought to be explored in greater detail.

Keywords: literature review, South Asian, medication adherence, cardiovascular
INTRODUCTION

Cardiovascular disease (CVD), which includes coronary artery disease (CAD), myocardial infarction (MI), and congestive heart failure (CHF) is the leading cause of mortality in Canada \(^1\). It carries high medical and social costs when considering hospitalizations, medications, disability and premature death \(^1\). Although mortality from CVD has decreased by as much as 70% over the last four decades due to medical treatments and changes in lifestyle, people living with CVD need optimal treatment for quality and longevity of life \(^2, 3\).

Cardiovascular disease rates vary by ethnicity. For example, observations over decades have revealed that South Asians (those whose ancestry originates in India, Pakistan, Sri Lanka and Bangladesh) whether immigrants or natives, have higher CVD rates than Caucasians \(^4-8\). In addition, South Asian men experience their first acute myocardial infarction (AMI) 5.8 years younger than men of other ethnicities \(^8-10\).

Adherence with Medications

Medical management is the most common approach to treat or control CVD. Taking prescribed medications for CVD is largely a lifetime commitment. The goal of using medications is to preserve optimal heart function for as long as possible to prevent mortality \(^11\). This is of greater importance to South Asians due to the higher rate of CVD and the earlier age at which it manifests.

Once medications are prescribed, it is important that they be taken as prescribed, to reap the intended and necessary benefits \(^12\). The cost of failed adherence to medications increases healthcare costs \(^13\). An adherent group of statin users had healthcare costs over an 18 month period of $10,198 \(\pm\) $39.4 (mean \(\pm\) SE) versus a non-
adherent group $11, 102 \pm $84.3 (p < 0.001)\textsuperscript{13}. Hospitalizations and the associated costs were also increased when medications were not taken. Non-adherent patients had an odds ratio of 1.26 (95% confidence interval 1.21-1.31) of cardiovascular disease related hospitalizations when compared to statin adherent patients\textsuperscript{13}.

**Medication Adherence among South Asians**

There is some evidence to suggest that South Asians who have CVD are less likely than Caucasians to comply with their medication regimen\textsuperscript{14}. The high incidence of CVD in the South Asian population makes it imperative to understand the factors that influence adherence and non-adherence to cardiac medications. To date, there has been little examination of the factors related to South Asians’ adherence or non-adherence to cardiac medications. South Asian immigrants to Canada (and other ethnic minorities) are faced with many challenges in seeking and obtaining healthcare (e.g., healthcare providers not speaking the patient’s foreign language or a lack of understanding the patient’s culture)\textsuperscript{15}. Examination of the factors that lead to non-adherence and to adherence are needed. By understanding the factors involved, healthcare providers and policy makers will be better equipped to appraise the care presently given and implement appropriate changes to better serve the health of South Asians.

**THE REVIEW**

**Aim**

The aim of this narrative literature review was to examine the current state of knowledge regarding the factors that influence cardiac medication adherence among South Asians with CVD.
**Design**

We used an integrative review method, as described by Whittemore and Knafl (2005) to undertake this comprehensive synthesis of the literature related to South Asians’ adherence with cardiac medication. The review was performed using the framework put forward by the World Health Organization which was amended by Baroletti and Dell’Orfano (2010). This framework includes five elements that are associated with medication adherence: (1) patient related, as well as (2) socioeconomic, (3) the healthcare system (4) therapy related, and (5) condition related factors.

**Search Methods**

First, we searched the on-line database Cumulative Index to Nursing and Allied Health Literature (CINAHL); Medline(R) (Ovid); PsycINFO; EBM Reviews-Cochrane Central Register of Controlled Trials (Cochrane); EMBASE: Exerpta Medica Database, Drugs & Pharmacology, and Psychiatry (Embase). Key terms included South Asia, India, East India, Pakistan, Sri Lanka, Bangladesh, Asia, medication compliance, medication non-compliance and medication adherence (see Figure 1).

Combining the terms ‘South Asia’ or ‘India’ or ‘Pakistan’ or ‘Bangladesh’ or ‘Sri Lanka’ or ‘Asia’ or ‘East India’ and ‘medication compliance’ or ‘medication non-compliance’ or ‘medication adherence’ produced a reasonable volume of search results. By limiting the search further in Medline with the term ‘cardiovascular disease’, only two valid results returned; the term ‘coronary artery disease’ returned no results. A decision was thus made not to utilize either ‘cardiovascular disease’ or ‘coronary artery disease’ as search terms, to broadly review titles of articles, and eliminate articles in a manual, systematic manner.
We reviewed English language studies found in the databases pertaining to the South Asian population and medication adherence factors. Preliminary criteria for inclusion in this review were search results that: (1) pertained to the South Asian population; (2) addressed medication adherence; and (3) were published between January 1980 and January 2013.

Search Outcome

The initial search strategy yielded 1286 results. The first author assessed the search results using the preliminary inclusion criteria. The subsequent 59 results were then analyzed and eliminated if found to be commentaries, poster sessions from conferences, book chapters or dissertations. Reference lists from the remaining articles were also reviewed for additional relevant articles. Duplicates were removed from the remaining 51 original published studies leaving 45 studies. Then, articles focusing on diseases not directly related to CVD (e.g., HIV, leprosy) and which did not include South Asians were excluded.

Quality Appraisal

The final sample selection was guided by the following criteria: (1) the report of original qualitative or quantitative research, and (2) conclusions derived regarding South Asian patients’ adherence to cardiac-related medications. The final screening was done by the first author, with consensus of the co-author on the final selection. At this point 32 articles were removed because they were not reports of original research or no conclusions were derived specifically about South Asian cardiac patients. Thirteen articles remained (see Table 1 and Figure 2).
Data Abstraction

Relevant details about the remaining articles were extracted (i.e., number of South Asian participants, study design, how adherence was measured, and factors associated with adherence or non-adherence) from the original sources. This enabled clear identification of the potentially salient matters upon which the articles would be synthesized or compared. Doing so also provided an ‘audit trail’ as well as a mechanism for the reader to examine how the authors came to the synthesis below (Oxman, Guyatt, Cook, & Montori, 2002). The qualitative and quantitative studies were processed in the same manner.

Synthesis

The remaining papers in this review of the literature reflected the inconsistency of the methodologies used to study medication adherence, mechanisms used to measure adherence, and factors identified as associated with cardiac medication adherence in South Asian cardiac patients. Recent interest in the topic is reflected by the fact that five of the thirteen studies being published in 2011. Although the literature search dated back to 1980, the earliest study found was published in 1996. Three randomized controlled trials were found, two database reviews, and eight studies with cross-sectional designs. The sample size in these studies was generally small, even among the randomized controlled trials, with half of the studies having sample sizes less than 200. Adherence was measured in a variety of ways. Concerns regarding the quality and consistency of the studies led to each article being reviewed for validity.
**RESULTS**

**South Asians**

The majority of studies in this review originated from South Asian countries; Pakistan, India and Sri Lanka. A large number of emigrants from these countries over the decades have resulted in substantial pockets of South Asian people residing in countries around the world—such as the countries from which the remaining studies originated: Norway, Denmark and Canada. Conspicuous in its absence is the United Kingdom, a country which has a sizable South Asian population and from which no medication adherence studies were identified.

**Adherence with Medications**

**Methods of measurement.** Multiple methods of measuring medication adherence and varying cut off rates for adherence were used. The simplest methods of measuring adherence were pill count and self-report, while other more sophisticated methods such as the Brief Medication Questionnaire or the Morisky Medication Adherence Scale were also used. The range of adherence was defined by patients consuming >80% of prescribed medications, consuming >50% of medications or as patients ‘regularly’ taking their medication. Direct comparison between studies was not possible given the wide variation in measurement and cut off values for adherence.

**Adherence rates.** Adherence rates varied widely between the studies, ranging from 0% to more than 85% adherence with statin medications. The most consistent medication adherence rates were observed in studies from Denmark and Canada, which ranged from 60% to more than 80%. These were administrative
database studies, which allowed for statistical analysis of prescriptions filled over an extended period of time, however they lent little insight into the factors involved.

Adherence with medications for chronic conditions tapers off over time following initiation of treatment \(^{30,31}\). Other than the database studies in this review (in which patients were followed from 1 to 5 years; \(^{14}\), medication adherence was measured over time frames of less than six months (one to six months). The inclusion criteria for most of the studies did not require a six month period of prior prescriptions for cardiac medications, thus the short length of time that medication adherence was measured brings into question the validity of the conclusions regarding adherence rates \(^{18,21,24,27}\). In addition, several intervention studies indicated that medication adherence rates were to be followed for an additional six months beyond completion of the intervention, however, these rates were not reported \(^{19,24}\).

**Adherence with specific cardiac medications.** Both Lai et al. \(^{14}\) and Hempler et al. \(^{28}\) conducted administrative database studies investigating medication adherence rates of patients after AMI. E. Lai et al. \(^{14}\) compared adherence rates for angiotensin-converting enzyme inhibitors (ACEI), beta-blockers (BB), statins, calcium channel blockers (CCB), and diuretic medications, while Hempler et al. \(^{28}\) explored BB and statin medication use for CVD. South Asian patients were more adherent with BB medications than other ethnicities [Odds ratio (OR) 1.3; 95% confidence interval (CI), 1.04-1.62; \(p=0.02\)] \(^{14}\). South Asians were less likely to initiate treatment with BB medications than Danish people (OR 0.52; 95% (CI) 0.34-0.8) and were more likely to terminate treatment with BB, [hazard ratio (HR) 1.59; 95% CI 1.21-2.08)] within two years of their AMI in comparison to Danish residents \(^{28}\). E. Lai et al. \(^{14}\) also found South
Asians were less likely to comply with ACEI medications compared to non-Asians (e.g., Caucasian majority; OR 0.78; 95% CI 0.61-0.99; p=0.04)\textsuperscript{14}. Neither study revealed significant differences in adherence with statin medications.

**Patient Factors Associated with Cardiac Medication Non-Adherence**

The main patient reasons for non-adherence were forgetfulness\textsuperscript{17, 18}, side-effects\textsuperscript{17, 18, 20, 24-27}, and choosing not to taking the medication\textsuperscript{17, 20, 24, 27}. Most of the studies reviewed were conducted in India and Pakistan, where language barriers would not be a factor. For South Asians living outside of South Asian countries, language barriers could be problematic\textsuperscript{14, 28}. However, this matter has not been explicitly studied.

**Forgetfulness in taking medications.** Forgetfulness was a major factor for non-adherence\textsuperscript{17, 18}. Consuming medication on a daily basis requires memory. Memory is utilized in adherence with medications by two aspects: habit forming and physical prompts that people employ to aide their memory. Habits take time and effort to form. Hashmi et al.\textsuperscript{18} contended that non-adherent patients are afraid of forming habits and resist a routine; others are afraid of becoming addicted to their cardiac medications (27%). This contrasts with adherent patients who believed that taking their medications would prevent future illness and sought out methods to form habits\textsuperscript{20}.

The physical implementation of habituating medication consumption often utilizes memory-triggering prompts. Many people found weekly pillboxes or blister packs helpful, or even keeping the medication in visible areas of the house was associated with higher adherence\textsuperscript{18, 27}. Another option is to utilize technology with reminders such as telephone calls or text prompts\textsuperscript{17}. Patients should be aware that options are available.
to help them out and a convenient reminder system that will work for each individual could be accessed.

**Side-effects from medications.** Medication side-effects were identified as a key reason for patients’ non-adherence \(^{17, 18, 20, 24-27}\). There are common side-effects to cardiac medications [e.g., lethargy and dizziness with BB, ACEI, etc. \(^{32}\)]. However, there is some evidence that medication side-effects may vary by ethnicity \(^{33}\). Different ethnicities may metabolize medications at varying rates. The South Asian population has not been included in studies with other ethnicities to study the frequency or type of medication side-effects. The growing population of South Asians in developed countries may lead to future studies to examine this phenomenon.

**Patients choosing not to take medications.** A frequent cause of non-adherence relates to patients simply deciding not to take their medications \(^ {17, 27}\). Patients desired a certain amount of control over their medication regime. Irregularities in the pharmaceutical industry in Pakistan have led people to believe that generic formulations are not safe and contain harmful additives \(^ {27}\). Thus, they request the brand formulation of a medication not be substituted for the generic formulation, even if additional fees are levied. In spite of this, many patients received generic substitution but were unaware of the fact \(^ {27}\). When this request was not accommodated, patients chose at times not to take their medications \(^ {27}\).

**Disruption to daily routines.** Two reasons for disruption to a daily routine within the South Asian community are fasting periods for religious reasons and travelling back to the country of birth or homeland \(^ {18, 24, 27}\). A patient’s medication schedule will need to be altered under these circumstances. Initiative is required on the part of the
patient to either bring medications along on their trip or obtain them during travelling periods. Ethnic minorities are known to show less initiative than other patients in presenting their concerns to physicians. Fasting periods need careful monitoring of food and medication, particularly in view of the high percentage of diabetics among the South Asian cardiac population. How communication between physician and patient affects care during this time period is unknown.

**Lack of patient knowledge.** The WHO indicated that patients’ knowledge of their medications is merely one factor in the equation of achieving medication adherence. Reasons for not taking medications identified in this review included feeling healthy or ill. In one study when patients (37.8%) believed the medications were ineffective they stopped taking them. When patients believed that a particular medication was no longer required, they would stop taking the medication to see if their body felt any different. Another reason for non-adherence was that patients wanted to schedule their own convenient times for medications, regardless of what was recommended by healthcare providers.

**Patient Factors Associated with Cardiac Medication Adherence**

**Patient education.** Educating patients about the purpose of their medications has long been believed to be a major component in enhancing adherence with medication regimes. In a randomized controlled trial with a pharmacist teaching group and a usual care group, the pharmacist-taught group had adherence rates of 92.24%, while the usual care group had adherence rates of 84.71%. In another study, a cohort (pre-post test) who had a pharmacist teaching intervention, had adherence improve from 0% to 95.4%
six months later\textsuperscript{24}. Both these studies indicated teaching by pharmacists is beneficial to South Asian patients’ adherence with medication regimes.

In another RCT, researchers examined the effectiveness of educating family physicians about managing blood pressure in improving patient adherence with medication\textsuperscript{19}. Medication adherence was improved when physicians spent ten minutes or more with the patient during a consultation. While the direct mechanism of action is somewhat unclear, what is known is when physicians explain to patients why the medication is being ordered, the patient is more likely to be adherent\textsuperscript{18, 19}.

**Family support.** Support from family members has been linked to medication adherence among South Asians\textsuperscript{19}. Support may be extended in a number of ways. For example, patients may need to rely on the support of family members to remember to take medications or to take them as prescribed\textsuperscript{18}. Family members may also accompany patients to physician appointments, provide transportation to pick up medications from the pharmacy, pay for the cost of the medications or provide translation services\textsuperscript{19, 27, 35}.

**Socioeconomic Factor—Cost of Medications**

Cost of medications has been identified as a factor in medication adherence\textsuperscript{12, 36}. In this review, the socioeconomic factors that affected non-adherence were identified as lower income, unemployment, retirement, low education level and illiteracy\textsuperscript{18, 23, 28}. A high percentage of the South Asian population in Canada are immigrants and have lower incomes than the National average\textsuperscript{37, 38}. South Asians were also prescribed a greater number of medications than other ethnicities, thus one could conclude the overall cost to an individual per year would be greater than other Canadians\textsuperscript{14}. In addition, the South
Asian cardiac population could incur greater costs over their lifetime due to the earlier age of CVD onset.

**Healthcare System Factors**

**The healthcare system.** Patients struggle in accessing an unfamiliar healthcare system. In particular, they experience difficulties navigating their way to find and see physicians and pharmacists to obtain an accurate diagnosis and appropriate medications\(^\text{18, 22}\). The factors involved with the cost and access to medication vary by country. In Denmark, patients are only partially reimbursed for physician visits for chronic conditions, thus financial constraint may be experienced\(^\text{28}\). In Norway, patients are at risk of non-adherence if they do not make appointments early enough to see their physicians before cardiac medication prescriptions expire\(^\text{27}\). Canada has a socialized healthcare system where physician and hospital visits are covered but there is a cost associated with obtaining medication; additional personal insurance may reduce or eliminate this cost. In Pakistan, many healthcare fees are paid out of pocket\(^\text{19}\).

Another reason that non-adherence occurs is due to lack of direct contact between the patient and healthcare provider. This occurs either due to a language barrier or delivery service that is offered by the pharmacy. When family members pick up the medications on behalf of patients, there is a disconnect between the pharmacist and the patient\(^\text{27}\). That is, the pharmacist is not able to directly communicate with the patient regarding specific instructions or concerns for medications.

**Knowledge deficit among healthcare providers.** Healthcare providers can contribute to increasing patients’ medication adherence by being cognizant of their own learning needs about managing CVD and its risk factors. The WHO has confirmed a
need to improve knowledge and training for healthcare providers\textsuperscript{12}. Subsequent to physicians taking a special course in blood pressure management (which included identification of hypertension, risk factor modification, medication management and physician-patient communication) adherence among patients with blood pressure medications improved\textsuperscript{19}. National-level programs for healthcare professionals are recommended to deal with educational needs for CVD. This recommendation is based on the improved recognition and treatment of patients by physicians certified as Clinical Specialist in Hypertension program by the American Society of Hypertension in the United States\textsuperscript{19}.

**Therapy-Related Factors Associated with Non-Adherence**

The frequency of medication administration can be a source of non-adherence (Soliman et al., 2011), especially in those with a chronic disease such as CVD. Frequency may be defined as: 1) the number of tablets consumed each day, 2) the number of times throughout a day medications are required and/or 3) the number of unique medications per day. Studies examined in this review revealed mixed results—too few and too many pills were presented as factors associated with non-adherence\textsuperscript{17,18}. Dennis\textsuperscript{22} found that 62.2\% of patients had problems remembering their medication schedule. Once a day dosing with fewer medications increased adherence in a study by Palanisamy and Sumathy\textsuperscript{24}.

**Condition-Related Factors**

The nature of CVD is such that there are often few chronic symptoms. Exceptions could include ongoing chest pain related to CAD (often relieved with nitroglycerine) or shortness of breath related to CHF (often relieved with diuretics). These medications are
used for symptom management in certain patients and are not included in a therapeutic classification of medication utilized to diminish CVD mortality. Thus, the lack of symptoms from CVD makes condition-related factors difficult to assess.

People who experienced hospitalization or complications from hypertension were more adherent with medications than others (Hashmi et al., 2007). Increased adherence in this group of people may be related to teaching received about their medications or a belief that the medications would prevent future sickness. Specifically, having physicians explain the need for the medication has been associated with increased medication adherence. In keeping with the WHO postulation, those patients who understood the long-term implications of their medications were much more adherent (86%). Lastly, a belief that the medication would be more helpful than harmful to their body increased adherence.

DISCUSSION

Medication adherence is difficult with any disease state and CVD has its own unique challenges. Cardiovascular disease has few symptoms; yet multiple medications are often required. Those adherent with medications are bound to experience side-effects from the medications taken, such as weakness and dizziness. Thus the factors associated with medication adherence with CVD are often based on motivation to reduce morbidity and prolong one’s life, and not symptom relief.

While a patient is responsible for taking their medication as prescribed, the healthcare industry also needs to respond to known causes for non-adherence among patients—such as the frequency of prescribed medications. This is especially true in light of the fact that 72% of hypertensive patients are prescribed more than one medication to
control blood pressure\textsuperscript{17} and frequently require three or four medications\textsuperscript{39}. For patients with CVD, even more medications are added such as an antiplatelet medication and lipid-lowering agent. To combat the number of ‘pills’ that need to be taken, a long-term project is underway to implement a ‘polypill’ to decrease the frequency and number of tablets patients need each day. This project entails developing a single pill containing aspirin, lipid lowering agent, ACEI and diuretic medications\textsuperscript{7,26}. Other combinations of cardiovascular medications are also being studied on an ongoing basis. The ‘polypill’ is an unusual concept and requires future investigations into the efficacy and effectiveness of combining multiple classifications of medications. If successful, combination medications would ease the frequency of medication consumption and potentially enhance adherence.

Medication non-adherence is a multifaceted issue for CVD patients and South Asians experience similar reasons for medication adherence and non-adherence as seen in other populations. Issues such as forgetfulness, patients choosing not to take medications, cost, frequency of medication dosing and multiple daily medications, can lead to a decrease in adherence. Expanding the knowledge of patients regarding the purpose of medications is one factor to increase adherence but that alone will not create adherence\textsuperscript{12}.

Two factors that require more exploration in the South Asian population are the utilization of complementary and alternative medicines (CAM) by patients and the side effect profile for CVD medications. South Asian patients frequently use CAM and the effect of doing so on medication (non-) adherence has not been established. Secondly, a clear profile of the side-effects experienced by South Asians to CVD medications is
needed. For example, there is an increased cough associated with ACEI use in the Asian population (McDowell et al., 2006). This kind of ethnic difference needs to be identified for South Asians.

South Asian immigrants may experience different reasons for non-adherence than those residing in South Asian countries. Issues such as language barriers, socioeconomic barriers in obtaining medications and lack of adequate extended family support may inhibit adherence. Further investigation into how language barriers affect adherence and how this can be mitigated should be investigated.

CONCLUSION

In this review of the literature, factors frequently associated with non-adherence such as forgetfulness, side-effects and cost were found among South Asians. These findings corroborate the WHO framework for medication adherence in which contributing factors for medication adherence included the patients, the healthcare system, socioeconomic environments and therapy related issues. The South Asian population is spread throughout the world. As the studies in this review were primarily based in Pakistan and India, more studies are needed about medication adherence to explore how South Asians with CVD fare as immigrants in developed countries.
REFERENCES


6. McKee PM, Ferrie J, Pierpoint T and Marmot M. Association of early-onset coronary heart disease in South Asian men with glucose intolerance and


Figure 1. Search strategy for preliminary search

The following databases were searched for the years 1980 to October 2011: CINAHL, Medline, PsycINFO, Cochrane, and EMB.

Exp “South Asia” or
Exp India or
Exp “East India” or
Exp Pakistan or
Exp “Sri Lanka” or
Exp Bangladesh or
Exp Asia or
and
Exp “medication compliance” or
Exp “medication non-compliance” or
Exp “medication adherence” or

MeSH® terms:
Asia, Western
Medication Adherence
South Asian cultural group
Prescribing drugs/drug therapy
Figure 2. Screening process
<table>
<thead>
<tr>
<th>Country/Setting</th>
<th>Author(s)/Year</th>
<th>Participants</th>
<th>Study Design</th>
<th>Adherence Rate/Measurement of Adherence</th>
<th>Factors Related to (Non-)Adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pakistan/Outpatient Clinic</td>
<td>Almas et al. (2006)</td>
<td>200 Pakistani patients (mean age 58.1 years); 33.5% women; initiated on anti-hypertensive medications six months prior; recruited by convenience from tertiary care hospital clinics</td>
<td>Cross Sectional; Survey</td>
<td>•57% adherent/ Missed medication doses in previous six months (&gt;12 doses missed—severe; 6-12 doses missed—moderate; &lt;6 doses missed—mild non-adherence)</td>
<td>Non-adherence •56.8% forgetfulness •12.7% deliberate miss •11.6% side-effects •10.4% too many tablets •4.6% lack of instruction from physician •3.5% cost</td>
</tr>
<tr>
<td>India/Community</td>
<td>Bharucha and Kuruvilla (2003)</td>
<td>2,415 Indians (median age group 50-59 years); 54.5% women; diagnosed with</td>
<td>Cross Sectional; Survey</td>
<td>•63.7% adherent/not defined, stated as “regular” use</td>
<td>Not identified</td>
</tr>
<tr>
<td>Study</td>
<td>Authors</td>
<td>Participants</td>
<td>Methods</td>
<td>Adherence</td>
<td>Non-adherence</td>
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<tr>
<td>India/ Outpatient Clinic</td>
<td>Dennis and Meera (2011)</td>
<td>608 Indians (mean age 58.4 years); 48.7% women; Initiated anti-hypertensive medication &gt;6 months; recruited by random selection from major hospital</td>
<td>Cross Sectional; Mixed Methods (Questionnaire and Interviews)</td>
<td>•50.3% adherent/ Brief Medication Questionnaire (BMQ)</td>
<td>•78.6% difficulty paying for medication •54.9% difficult to obtain refills on time •37.8% believe medication not working •5.9% medication bothered them •62.2% difficult remembering dosage schedule •Duration of hypertension</td>
</tr>
<tr>
<td>Country/ Community</td>
<td>Reference</td>
<td>Sample Size</td>
<td>Sample Description</td>
<td>Study Design</td>
<td>Adherence Rate</td>
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</table>
| Norway/ Community  | Hakonen and Toverud (2011) | 83 first generation Pakistani immigrants (mean age 57.8 years); 61.4% women; using anti-hypertensive, anti-diabetic and/or cholesterol-lowering medications; recruited by convenience through two social groups | Cross Sectional; Mixed Methods (Survey and Semi-structured Interview) | Adherence rate not identified/Not measured | •46% difficulty remembering  
•31% deliberately abstained (unknown reason)  
•18% took ‘drug holidays’  
•other reasons included: side-effects, feeling healthy, travelling, running out of medication, being dispensed generic instead of brand name medication (did not recognize pill or name) |  |
| Pakistan/ Not clearly identified | Hashmi et al. (2007) | 460 Pakistani patients (mean age 52 years); 54.6% women; diagnosed | Cross Sectional; Survey and Morisky | •77% adherent/self report (<80% of medications taken); | Adherence  
•82% understanding need for medication |  |
(assume Outpatient Clinic) with ‘essential’ HTN and taking antihypertensive medication for at least one month; recruited at two major hospitals

<table>
<thead>
<tr>
<th>Medication Adherence Scale (MMAS)</th>
<th>rate of non-adherent not identified using MMAS</th>
</tr>
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<tbody>
<tr>
<td>• 86% understand the effectiveness of the medication</td>
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<td>• 54% availability of support system</td>
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<td>• 56% making medication adherence a ‘habit’</td>
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<td>• 40% keeping medication in sight</td>
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<tr>
<td>• those with complications from HTN</td>
<td></td>
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<tr>
<td>• greater number of hypertensive medications</td>
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<tr>
<td>• those hospitalized within last 2 years</td>
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<tr>
<td>Non-Adherence Survey</td>
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<tr>
<td>• 12% lack of access to medication</td>
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<tr>
<td>• 40% cost of medication</td>
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<tr>
<td>• 27% fear of ‘getting used to’ the medication</td>
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<tr>
<td>• 17% side-effects</td>
<td></td>
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<tr>
<td>• 13% dissatisfaction with treatment</td>
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<tr>
<td>• 26% traveling</td>
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<tr>
<td>• lack of understanding regarding when to take medication (e.g., taking medication when they thought BP was high)</td>
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<tr>
<td>Country/Community</td>
<td>Study</td>
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<tr>
<td>Denmark/Community</td>
<td>Hempler et al. (2010)</td>
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<tr>
<td>Location</td>
<td>Study Authors</td>
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</table>
| India/Outpatient clinic | Joshi et al. (1996) | 139 Indian patients (mean age 55 years); 40.3% women; newly diagnosed HTN patients; recruited as consecutive patients from cardiology clinic | Prospective (3 months); Survey and Questionnaire | •39% of uncontrolled HTN patients were compliant  
•79% of controlled HTN patients were compliant  
/Measured by pill count (>80% of pills being consumed) | Non-adherence  
•widow/widower  
•stress |
| Canada/Community | Lai et al. (2011) | 511 South Asian AMI patient subset (total sample 9,926; all ≥ 65 years); 39.9% of South Asian women; AMI survivors discharged from hospital during 1995-2002 and | Administrative pharmaceutical database | •79.9% were compliant with at least one of B-blocker, ACEI, statin/Proportion of days covered with adequate (> 80%) prescriptions labeled as adherent | Not identified |
prescribed ACEI\(^1\), BB\(^3\), statins\(^*\), CCB\(^1\), or diuretics

<table>
<thead>
<tr>
<th>India/Outpatient clinic</th>
<th>Palanisamy and Sumathy (2009)</th>
<th>43 Indians (mean age 59.6 years); 41.9% women; diagnosed with HTN for &gt; 6 months; recruited by convenience from discharged patients of tertiary hospital</th>
<th>Pre-test, Post-test of 6-month pharmacist intervention; Mixed methods; Open-ended Interview/MMAS</th>
<th>•0% patients adherent at baseline interview and 95.4% compliant at end of study/MMAS</th>
<th>Adherence •once a day dosing •fewer medications Non-adherence •74.4% side effect of drugs •20.9% alter own regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>•71.4% adherent ACEI •63.4% adherent BB •85.4% adherent statins •68.4% adherent CCB •33.8% adherent diuretics •82.6% adherent ACEI, BB, or statin</td>
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<tr>
<td>Reason</td>
<td>Percentage</td>
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<tr>
<td>Think drug ineffective</td>
<td>39.5%</td>
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<tr>
<td>Don’t care to take medications</td>
<td>9.3%</td>
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<tr>
<td>Feeling ill</td>
<td>16.3%</td>
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<tr>
<td>Alter dosing schedule for convenience</td>
<td>16.3%</td>
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<tr>
<td>Discontinue to see if still needed</td>
<td>16.3%</td>
<td></td>
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<tr>
<td>Fasting</td>
<td>39.5%</td>
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<td></td>
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<tr>
<td>Forget</td>
<td>72%</td>
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<tr>
<td>Confusion/hiding pills</td>
<td>16.3%</td>
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<tr>
<td>Too expensive</td>
<td>18.6%</td>
<td></td>
<td></td>
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<tr>
<td>Trouble swallowing pills</td>
<td>9.3%</td>
<td></td>
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</tbody>
</table>
| India/Outpatient clinic | Ponnavaskar et al. (2004) | 90 Indians (age 41-60 years); 44.4% women; diagnosed with chronic condition such as HTN, diabetes mellitus, cardiovascular conditions and bronchial asthma; diagnosed for > 6 months and prescribed medications; recruited by convenience (chronological order) from a hospital based clinic | Randomized Controlled Trial (RCT) of Medication Counseling | • 4.7% trouble reading labels

- Adherence
  - • 92.2% by pill count adherent in the counselled group compared to 84.7% in the usual care group;
  - • 75% self-assessment methods always adherent in compared to 66.6% in usual care group/
  - adherence measured by total pills consumed divided by doses prescribed

- Non-adherence
  - • 57.1% forgetfulness (counselled)
  - • 36.8% forgetfulness (usual care)
  - • 28.6% cost (counselled)
  - • 15.8% cost (usual care)
  - • 11.1% side-effects and lack of accessibility (counselled)
  - • 47.4% side-effects and lack of accessibility (usual care)
<table>
<thead>
<tr>
<th>Pakistan/Community</th>
<th>Qureshi et al. (2007)</th>
<th>A subset of 178 Pakistanis (mean age 55.3 years); 62.5% women; diagnosed with HTN; recruited by convenience from previous study</th>
<th>Substudy of RCT of Education for Physicians; Survey</th>
<th>• 48.1% adherence in intervention group (physicians given training in hypertension management) and 32.4% adherence in control group/ ≥ 50% of medications consumed measured by electronic medication event monitoring system bottle</th>
<th>Adherence • physician spending &gt;10 minutes per consultation with patient • physician explaining the purpose of the medication • physician receiving special training in BP management • higher education • belief in taking medications • encouragement by family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pakistan/Saleem et al.</td>
<td>385 Pakistanis (mean age)</td>
<td>Cross Sectional;</td>
<td>• 0% good adherence/</td>
<td>Adherence</td>
<td></td>
</tr>
<tr>
<td>Outpatient Clinic (2011)</td>
<td>39 years; 31.2% women; diagnosed with ‘essential’ HTN; using antihypertensive medications for &gt;6 months; recruited by convenience sampling from two tertiary hospitals</td>
<td>Questionnaire Drug Attitude Inventory</td>
<td>•35.3% moderate adherence •64.7% non-adherence</td>
<td>•less knowledge of medication •the good things about medication outweigh the bad •does not choose to take medications •belief that medications enhance relaxed feeling or feeling ‘normal’ •belief that it is ok mind and body to be controlled by medications •taking medications prevent sickness</td>
<td></td>
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</table>
### Sri Lanka/Outpatient Clinic

**Soliman et al. (2011)**

- 216 Sri Lankans (59.1 years); 72.7% women; those with no established cardiovascular disease but a Framingham Score $\geq 20\%$; recruited from three clinical sites

**RCT of polypill use; Structured Interview**

- *80% adherence in Polypill group/pill count and self report (adherence identified as $>80\%$)

**Non-adherence**
- feeling uncomfortable taking medications
- feeling sluggish and tired
- belief that medications should be taken only when sick

*HTN=hypertension

†AMI=acute myocardial infarction
‡ ACEI = angiotensin converting enzyme inhibitor
§ BB = beta blocker
† CCB = calcium channel blocker
CHAPTER 3: METHOD

“Qualitative social research investigates human phenomena that do not lend themselves, by their very nature, to quantitative methods.”

(Carspecken, 1996, p. 3)

Although there is evidence that medication adherence is low for cardiac patients and for South Asian patients in particular, the nature or breadth of the factors that lead to this problem are not well known. Qualitative research enables an in-depth exploration of values and understandings of taking cardiac medications among the South Asians; revealing the ‘how’ and ‘why’ of this phenomenon.

Ethnography

Ethnography, a qualitative research method, originated within the discipline of anthropology, with people spending years imbedded among groups of people to study a culture (Loiselle, 2011). Ethnography involves the researcher, whether ‘overtly or covertly’ observing and joining in people’s lives “watching what happens, listening to what is said, asking questions, collecting whatever data are available to throw light on the issues that are the focus of the research” (Hammersley & Atkinson, 1995)

Richardson (2000) used five features to conceptually place research within the ethnographic paradigm. First of all, a substantive contribution needs to be made by the topic chosen. The factors that influence South Asians with CAD taking their medications have not been well explored and may become fundamental knowledge in the spectrum of medication adherence. Secondly, Richardson posed that there must be aesthetic merit of the work. Ethnography deals with thick description (Geertz, 1973). The ethnographic study will render an in-depth description of the factors that facilitate or impede South Asians adhering to cardiac
medications. Thirdly, there must be an impact from the study. The impact of an ethnographic study depends on the topic being studied and the writing ability of the researcher to ensure that knowledge translation of the research findings may occur. This ethnography will be published and study findings taken back to the communities of interest. Fourthly, expressing a reality is fulfilled by the finished document, which has a description that embodies the culture being studied. This is important because the reader may never experience the culture, yet a well-written study will allow a person to feel the experience. The ethnographic study immersed the researcher in the life of South Asian cardiac participants who live in a large urban center. The researcher, who is a healthcare professional, observed and analyzed the factors for medication adherence from the perspective of the participant. This required the researcher to set aside her own perspective. Finally, Richardson identified that reflexivity of the author must be present in the writing of the research.

Throughout the process of this ethnographic study, the researcher kept a journal to record thoughts and feelings regarding the situations that arose (Spradley, 1980). The journal also served to map out changes that occurred in the perspective of the researcher throughout the course of the research study as a greater understanding of the culture should have evolved (Emerson, Fretz, & Shaw, 1995; Seneviratne, Mather, & Then, 2009). The journaling process allowed the researcher to express thoughts, feelings and frustrations separately from the fieldnotes. Doing so rendered a more objective research study (Emerson et al., 1995).

**Design**

An ethnographic study should illuminate a yet under-appreciated element of care for South Asian patients-medication adherence. Ethnography provided a multi-faceted view of the factors involved with medication adherence (Hammersley & Atkinson, 1995). First, the
researcher engaged in observations of South Asian CAD patients in physician offices (where medications are prescribed) and at pharmacies (where prescriptions are potentially filled). In-depth interviews were then undertaken with the South Asian CAD patients who had been prescribed medications, their physicians and their pharmacists. Observations and interviews were guided and analyzed using the elements identified by WHO (2003), as well as Baroletti & Dell’Orfano (2010) as a beginning guide to provide classifications of the data as to the factors involved with medication adherence.

Data were also collected using the Morisky Medication Adherence Questionnaire (Morisky, Winter 2011) to quantitatively characterize the degree of medication adherence in the study participants. The 8-item scale contains questions focused on reasons why a person may or may not take their prescribed medications. Participants responded to each item (yes/no) and the score (range 0-8) was summed to provide an internal/ratio level score. A score of “0” represents the most adherent and “8” the least adherent. The scale has been shown to be reliable and valid with excellent concurrent and predictive validity (Morisky, Green, & Levine, 1986).

**Sample**

The sample was obtained by various methods. Physician clinics and pharmacies that serve South Asian CAD patients, and at which observations could be made, were identified. Both the physician/pharmacist practice and the South Asian CAD patient’s actions were the focus of observation. Permission was sought first from physicians and pharmacists to use their sites as observation venues (see Appendix A for letters of support and Appendix B for consents). Then, as South Asian CAD patients arrived, they were asked if they would be amenable to having the interaction observed by a University of Calgary researcher. They were also asked to sign a study consent (see Appendix C).
South Asian CAD patients were also interviewed (see Appendix D for consent). These people were recruited through the physician or pharmacy practices (either as people who had already been observed, or not). Physicians and pharmacists were also interviewed to glean their insights regarding South Asian CAD patients’ medication adherence (see Appendix E).

Inclusion criteria for South Asian study participants were: (1) self-identified as being South Asian (e.g., those who or whose ancestors originated from India, Pakistan, Bangladesh or Sri Lanka (Anand et al., 2000); (2) over 40 years of age; (3) had a CAD diagnosis; (4) had been prescribed any medication for their CAD (e.g., antiplatelet agents, beta blockers, statins and ACE inhibitors or angiotensin receptor blocking agents); (5) spoke English, Punjabi, or Hindi; and (6) was willing to be observed or interviewed for the study purpose. Exclusion criteria included: (1) impaired mental capacity or confusion as identified by their physician, pharmacist or family member; or (2) unwilling to sign an informed consent.

Observations occurred with thee physicians, six pharmacists and fifteen staff. Approximately 10 South Asian CAD patients were observed in each location, for a total of 40 observations. The interviews were conducted with 10 South Asian CAD patients, two physicians and three pharmacists. Data were collected until saturation (no new information was learned) occurred.

**Data Collection**

*Obtaining Access to the Setting*

The settings for the study included two pharmacies and two physician offices. Access to all these settings occurred through professional contacts. At each site, the healthcare provider was interested in the research topic because they had a significant South Asian clientele.
Observation remains a key element to an ethnographic study as an invaluable method for understanding the motivations and beliefs of community behaviour (Wing, 1989). Jackson (1973) described four possible researcher roles when undertaking participant observations. These include: Complete Participant, Participant-as-Observer, Observer-as-Participant, and Complete Observer. As a Complete Participant, the purpose and identity of the researcher are not revealed to those being observed. This method is now questioned on the basis of ethical reasoning, especially when dealing with vulnerable populations. In a Participant-as-Observer role, those being observed and the researcher are both aware of the research situation and the research question. A relationship is formed, from a surface level in observation situations to a more intense relationship with key informants and both parties trying to mutually work towards the goal of information sharing. In an Observer-as-Participant role, the researcher’s intentions are communicated to the observed group by those being observed. The outright proclamation of the project gives a certain freedom, whereby the group being observed may freely share their thoughts, due to the knowledge that the researcher is not a permanent fixture in the society. As a Complete Observer, the researcher has no involvement with the subjects and the subjects are unaware of the research project, due to remote observation, in this day and age-a recording device of some sort. As a ‘fly on the wall’, the researcher is privileged to actions and words that may not be stated in direct observation of the researcher, on the other hand, a sense of violation of privacy may occur and one needs to be careful of the ethical underpinning this method entails. For this study, the researcher took a Participant-as-Observer stance.

The collection of observational data was undertaken first and occurred over a six-month period. It is possible that new data would have been generated from the participant interviews
(described in the next section) that would have lead to a need for further observations. The physicians and pharmacists were made aware that this would be a possibility.

The observations began at physician clinics and pharmacies frequented by South Asian people. The researcher observed interactions between these healthcare providers and South Asian CAD patients. Fieldnotes were taken during these observations to document a variety of aspects of these interactions (for both the healthcare provider and the patient). Fieldnotes, handwritten in a notebook, allowed for both portability and discreteness; and were considered data (Mulhall, 2003). Keeping the elements identified by WHO (2003) as well as Baroletti & Dell’Orfano (2010) in mind, observations that were related to medication adherence were documented. Also, observations about space and sensory perceptions were made and documented. Fieldnotes included such details as drawings of the physical layout of the setting, a description of the smells and noise, as well as descriptions of the participants (including what they wear, how they act, facial expressions) around the researcher. Ultimately, the fieldnotes enabled the researcher to document the ‘trail of evidence’ that led to the study conclusions (Mulhall, 2003).

Interviews

In-depth interviews were conducted with physicians, pharmacists and South Asian CAD patients. The interviews took place in a place chosen by the participant; often at their pharmacy, their home or over the telephone. At the outset of the interview, all participants were asked to sign a consent form or to verbally consent. The participant was reminded of their right to withdraw at any time from the study and to not answer a question they chose not to. As indicated on the consent form, if the participant chose to withdraw from the study, data collected up to that point would be included as data, unless otherwise requested by the participant.
Again, keeping in mind the elements identified by WHO (2003) as well as Baroletti & Dell’Orfano (2010) interviews focused on the factors that influenced medication adherence. Spradley’s (1979, 1980) work guided the interview process. Spradley used the descriptors of ‘grand tour’ and ‘mini tour’ when describing interviews (1979) as well as observations (1980). As the words imply, ‘grand tour’ questions/observations are meant to be general in nature-to begin to get a sense of the big picture, whereas ‘mini tour’ questions/observations are meant to be more specific-to begin to get more detail. In the ‘grand tour’ phases of exploration, questions will begin with the general ‘who, what, where, when and how’ stems. Spradley (1979) suggested that a matrix that comprises the multiple dimensions of a social situation (i.e., space, actor, activity, object, act, event, time, goal, and feelings) be used to assist with assuring that questioning is comprehensive. Questions such as What has the healthcare team done to help the participant to obtain medications (provided prescriptions, identified a pharmacy)?; What has the healthcare team taught about the medication for and how long the participant should expect to take the medication? Thereafter, ‘mini tour’ questions will focus on the same dimensions as the ‘grand tour’ questions, however the focus will be on a smaller unit of experience. For example questions such as ‘What are all the pieces of advice you have received from your family regarding taking your medications?, Can you describe in detail the effects of taking this medication? will be used. Questions such as Spradley (1979) also made practical suggestions about techniques used during the interview. These include: (1) repeating the explanation about the study (e.g., I’m interested in finding out how people come to the decision to use or stop your heart medicines.), (2) restating as opposed to paraphrasing what is said by participants because it reinforces what has been said, demonstrates interest of the interviewer, and prompts the participants to continue-using their own language, and (3) asking for use of what is said rather
than meaning because ‘use’ provides information and context where as ‘meaning’ may imply that the participant is providing a ‘poor explanation’.

The interview followed a semi-structured pattern with the participant by starting with some prepared questions (Appendix F). The answers of the participants guided further questioning. No single interview was identical to another (Sorrell & Redmond, 1995). Varying lengths of time were required in the interviews to build the trust required to gain information (Corbin & Morse, 2003; Sorrell & Redmond, 1995). However, none of the interviews lasted more than one hour. Participants did not receive compensation for their part in the research study (as identified in the consent form).

Translation

To be as inclusive as possible, interviews with the South Asian CAD patients were undertaken in English, Punjabi, or Hindi. Graduate students or people who had acted as interpreters for other studies (qualitative and quantitative), undertaken by Dr. Kathryn King-Shier (thesis supervisor) assisted in interpreting the interviews. Most significantly, these translators were asked to capture both ‘translational’ or accurate literal translation as well as ‘conceptual equivalence’ or accurate translation of the meaning of what was being said by the participant (King, Khan, LeBlanc, & Quan, in press; Squires, 2009). In other words, we ensured that the ‘constructs’, ‘ideas’, or ‘phenomena’ of importance were captured as opposed to focusing only on translating ‘words’ (Hunt & Bhopal, 2004; Larkin, Dierckx de Casterlé, & Schotsmans, 2007; Squires, 2009; Temple & Young, 2004).

Translated interviews were audited by research assistants who did not participate in the original interview, but who speak the language of the participant. The purpose of the audits was to assure that the original translations of the interview questions and participants’ responses were
indeed conceptually appropriate/accurate. The research assistant listened to the audio recording of the interview and provided comments if and where discrepancies existed. Should there have been a large discrepancy in meaning, a third auditor would have been called to review the tape. If the discrepancy was considered minimal by the auditor, the additional notes will be used as data. This has been a useful process in Dr. King-Shier’s previous qualitative studies (King, LeBlanc, Carr, & Quan, 2007; King, LeBlanc, Sanguins, & Mather, 2006; King, Mather, & Sanguins, 2005).

**Transcription**

All fieldnotes and interviews were transcribed and used as data. The fieldnotes were transcribed by the researcher. Transcription of the interviews required the use of a transcription service whose employees had signed a confidentiality agreement.

**Data Analysis**

In ethnography, data analysis is a cyclical pattern aimed at developing a taxonomy of descriptors of the culture being examined (Spradley, 1980). Initial descriptive observations (written down by hand as fieldnotes) became data, as well interview transcripts. All data were first read line by line to look for similar words or meanings (i.e., concepts) and were grouped and named, or given an code (Emerson et al., 1995; Spradley, 1980). As many codes as possible were identified/used; one piece of data sometimes had multiple codes. This initial process informed ongoing observations and interviews; representing the cyclical nature of ethnography (Spradley, 1979, 1980). The researcher conducted meetings with her method expert, who is a committee member, to ensure the process was carried out in an appropriate manner.

As the data collection and analysis proceeded, the generated codes were categorized or grouped as domains and condensed. First level codes for each domain were clustered, based on
(dis) similarity of the content. While coding specific statements, they were compared with other statements in the same and different domains to understand the relationship amongst the statements within a particular domain. Each domain was named and mutually exclusive rules for inclusion were identified (Spradley, 1980). Thus, the domains were inductively generated from the data (observations and interviews) and attributes well defined. Numerous meetings were held between the methods expert, the supervisor and the researcher to analyze the data and ensure that domains were properly being identified. The need for further interviews was identified. During these interviews, questions were asked to test and define the structure of the domains identified (Spradley, 1979). Data generation and analysis ceased when saturation (no new data or findings) had occurred.

**Ethical Considerations**

The research protocol and associated materials were reviewed by the Conjoint Health Research Ethics Board of the University of Calgary and Alberta Health Services. All non-professional people (e.g., translators, transcriptionists) were appropriately educated regarding issues of confidentiality and signed confidentiality agreements. Data will be stored in a locked file cabinet in the research space of Dr. King-Shier. All data will be kept for a period of 10 years at which time it will be destroyed. Finally, in reporting the data, it will be anonymized to prevent any one of the participants from being identified.

**Limitations**

There will be some limitations to this study. First, a potential was the potential lack of volunteerism to participate in this study. It is widely believed that visible minority groups are less willing to participate in health research (Gilliss et al., 2001; Lindenberg, Solorzano, Vilaro, & Westbrook, 2001; Sheikh, 2005). However, the evidence from a systematic review of over 70,
000 persons suggests that differences in participation are actually very small when researchers ‘set out’ appropriately to include these groups (Wendler et al., 2005). Detailed records were kept regarding the number of people who declined to participate in the study. Second, there was a potential bias in the translation process. To ameliorate that potential, translated interviews were regularly audited by another person who spoke the language of interest. Should problems with translations been identified, the analysis would have been undertaken again based on the more valid translation.
CHAPTER 4

Manuscript #2: Factors influencing South Asian Cardiac Patients’ Medication Adherence: an Ethnographic Study

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ABSTRACT

Aim. This paper explores key factors associated with adherence to cardiac medications among South Asian cardiac patients.

Background. South Asians experience higher rates of cardiovascular disease than any other ethnic group. Some evidence suggests that South Asians may be less adherent to cardiac medication regimens than are Caucasians residing in Canada. Identification of the key factors contributing to adherence may assist this growing population to optimize their cardiac health.

Design. Ethnography was used to highlight population specific themes and domains related to medication adherence.

Methods. Between January to September 2012, Ethnographic observations and interviews were conducted with South Asian cardiac patients, physicians, pharmacists and staff who frequently interacted with this population. Fieldnote and interview data were transcribed verbatim and analyzed using ethnographic domain and thematic analysis.

Results. South Asian cardiac patients relied on family members for instrumental support in remaining adherent with their medications. Relationships with healthcare professionals who demonstrated clear communication and cultural awareness was associated with enhanced medication adherence. Memory mechanisms needed to be individualized and were generally ‘low technology’. While prepackaging of medications enhanced adherence, patients who used them were less knowledgeable about their medications.

Conclusion. Healthcare providers should understand the importance of including family members in the care of South Asian cardiac patients. They also need to appreciate that the quality of provider-patient relationships are important to South Asian patients and will influence
adherence to healthcare regimens. Primary healthcare teams, comprised of physicians, chronic disease nurses and pharmacists could provide a cost effective means of providing care.
SUMMARY STATEMENT

Why is this research needed?
• South Asians have higher rates of cardiovascular disease than any other ethnic group.
• South Asian men experience their first myocardial infarction at younger ages than other ethnic groups.
• Evidence suggests that South Asians are less adherent to cardiac medication regimens.

What are the key findings?
• South Asian patients rely on family for instrumental support regarding their cardiac medications.
• South Asian patients want to build relationships with healthcare providers that ultimately enhance adherence.
• ‘Low technology’ devices may improve medication adherence, but can be associated with a reduction in understanding of each medication.

How should the findings be used to influence policy/practice/research/education?
• Healthcare providers need to understand the importance of family members for the South Asian cardiac patient.
• Healthcare providers need to understand that relationships are important to South Asian patients.
• Healthcare providers in the community need to establish communication methods between each other.

Keywords: South Asian, medication adherence, cardiovascular, ethnography
Introduction

Cardiovascular disease (CVD), which encompasses coronary artery disease (CAD), myocardial infarction (MI), congestive heart failure (CHF) and cerebrovascular disease, has been diagnosed in 1.3 million Canadians and is responsible for the highest mortality rate (31%) in Canada (Wielgosz et al., 2009). Historically, Caucasian men were at greatest risk of developing CVD. However, CVD risk is now more widespread across the adult spectrum. Certain ethnic groups, such as South Asians (those whose ancestors are from India, Pakistan, Bangladesh or Sri Lanka), experience higher rates of CVD than Caucasians (Anand et al., 2000). South Asians are the largest visible minority in Canada and thus the high rate of CVD is a concern (Chui, Tran, & Maheux, 2008).

Medical management (e.g., prescription of medications) remains the major ongoing treatment for CVD over a patient’s lifespan (Smith et al., 2006). Medication adherence is often defined as taking at least 80% of the medication as prescribed (World Health Organization, 2003). Generally, adherence to medications is poor; declining throughout the length of time a patient is prescribed the same medication. For example, Lai et al (2011) demonstrated that by one year, MI patients’ adherence to taking an angiotensin-converting enzyme inhibitor (ACEI), beta-blocker (BB) or statin medication was 79.7%. Jackevicius (2002) reported only 36% of CAD patients continued to adhere to lipid-lowering medications after two years of treatment. Medication adherence rates are lower for South Asian cardiac patients than other groups. Lai et al (2011) showed South Asian patients were 22% less likely (95% CI 0.62-0.99) than Caucasians to adhere to cardiac medications. In another study, Hempler et al (2010) found Pakistani immigrants were 48% less likely to initiate BB medications than Danish born residents.
(95% CI, 0.34-0.80). Of the Pakistani immigrants that had initiated treatment with BB, 59% terminated treatment (95% CI, 1.21-2.08).

Canadians have 76.9 million cardiac prescriptions dispensed annually (IMS Brogran Disease Dynamics, Feb 2011). The cost of these medications is 3.1 million ($CAN) per year, which is managed predominantly through insurance plans (either government or private; IMS Brogran Disease Dynamics, Feb 2011). The cost of hospitalization and follow-up treatment due to cardiac medication non-adherence is not currently known. However, in 1999, it was estimated at 7-9 billion ($CAN) per year. (Choi et al., 1999). This is a large burden for Canada’s publicly funded healthcare system.

South Asians constitute an increasing proportion of the Canadian population (Tran, 2005). Given that they experience higher rates of CVD relative to Caucasians suggests a higher proportion of the South Asian population should be prescribed cardiac medications. A systematic review of the literature revealed that studies regarding adherence with cardiac medications among South Asians have largely been conducted in their home countries (e.g., India, Pakistan and Sri Lanka) and not in the context of being an immigrant to Canada (Ens, Seneviratne, Jones, Green, & King-Shier, unpublished). Thus, the purpose of this study was to examine the factors that influence South Asian medication adherence in the Canadian context.

**The Study**

**Aim**

The aim of the study was to uncover key factors related to medication adherence among South Asian cardiac patients residing in Canada.
Method

Ethnography provides a means to describe cultural nuances in order to uncover individual and group understandings of a phenomenon (Hammersley & Atkinson, 2007). It was used to explore factors mediating medication adherence particular to a South Asian population requiring cardiac follow-up care. First, the researcher engaged in observations of South Asian CAD patients, as well as physicians and pharmacists who treated them. These observations occurred in physician offices and at pharmacies. In-depth interviews were then undertaken with the South Asian CAD patients who had been prescribed cardiac medications, as well as with their physicians and their pharmacists. The research was framed around the World Health Organization’s (WHO) five dimensions affecting adherence with medications: patient related factors, health system factors, social/economic factors, condition related factors and therapy related factors (Table 1) (World Health Organization, 2003).

Settings and Participants

The study took place in multiple settings within a large Canadian city that is home to a sizable South Asian population. Most of the study participants came from India or Pakistan but it was not uncommon for people to have lived in another country prior to settling in Canada. The settings for the study were family physician offices and pharmacies frequented by South Asian CAD patients. The staff at the offices included office assistants, registered nurses, and family physicians as well as pharmacy assistants, technicians, interns and pharmacists, respectively.

The participants included South Asian cardiac patients, their physicians and their pharmacists. Inclusion criteria for South Asian study participants included: (1) self-identified as being South Asian; (2) ≥ 40 years of age; (3) had a CAD diagnosis; (4) had been prescribed any medication for their CAD (e.g., antiplatelet agents, beta-blockers, statins and angiotensin
converting enzyme inhibitors or angiotensin receptor blocking agents); (5) spoke English, Punjabi or Hindi; and (6) was willing to be observed or interviewed for the study. Exclusion criteria included: (1) impaired mental capacity or confusion as identified by their physician, pharmacist or family member; or (2) unwilling to sign an informed consent.

Three physicians, six pharmacists and fifteen staff from two physician offices and two pharmacies agreed to be observed. Ten South Asian CAD patients were observed in each of the locations (n=40). Interviews were also conducted with South Asian CAD patients (n=8), physicians (n=2), and pharmacists (n=3).

**Ethical considerations**

The research protocol was approved by the Health Research Ethics Board. The study was introduced to the different study sites by direct communication either by telephone or in person. Written consent was obtained from all patients as well as staff in the physician and pharmacy offices, both to directly observe them and engage in interviews.

**Data Collection**

**Ethnographic** fieldwork of participant observations took place from January to September of 2012. Observations were undertaken on multiple days of the week, during all possible hours when the healthcare facilities were open; over a block of three hours, for two days per week. They were made by the fieldworker (TE) in the waiting area, in the consultation rooms of the physicians’ office or the pharmacy, as well as behind the counter of the pharmacies.

Fieldnotes were written by hand in a journal as observations were made. Each day’s observations were then reviewed at the end of the day and expanded upon to ensure clarity. A separate journal was kept for the fieldworker to express ideas or concerns about the situations. This allowed the fieldworker to reflect about the data collected for the study. The fieldnotes
were transcribed into a typed document. As the observation days continued, the fieldnotes became more focused by identifying themes that occurred over and over.

In-depth interviews were conducted with patients, physicians and pharmacists. The interviews took place in a location chosen by the participant; most frequently the physician office or pharmacy. Spradley’s work (1979, 1980) guided the questioning process whereby the descriptors of ‘grand tour’ and ‘mini tour’ describe the interviews. As the words imply, ‘grand tour’ questions/observations were meant to be general in nature, to get a sense of the big picture, whereas ‘mini tour’ question/observations were meant to be more specific in order to obtain more detailed information. All interviews were guided by the factors associated with medication adherence as identified by the WHO (2003) and Baroletti & Dell’Orfano (2010; see Table 1). The interview followed a semi-structured pattern starting with some prepared questions with the answers of the participants guiding further questioning. None of the interviews lasted more than one hour.

Interviews were audio taped, transcribed and then were utilized as data. A transcription service was used. Those transcribing interviews were asked to sign a confidentiality agreement.

The Morisky Medication Adherence Scale was administered to each patient to assist with guiding the interview and theoretical sampling. The sampling method was undertaken to provide a deep understanding of emerging concepts (Coyne, 1997) and guided the interviews of patients (Morisky, Green, & Levine, 1986). This 8-item scale contains questions focused on reasons why a person may or may not take their prescribed medications. Participants respond to each item (yes/no) and the score (range 0-8) is summed to provide a score. A score of “0” represents the most adherent and “8” the least adherent. The scale has been shown to be reliable and valid with excellent concurrent and predictive validity (Morisky et al., 1986).
Translation. Interviews with the South Asian CAD patients were undertaken in English or Punjabi (there were no Hindi-speaking participants). When the patient spoke Punjabi, interview questions and responses were translated immediately by an interpreter. Translated interviews were then audited by research assistants who did not participate in the original interview but who were fluent in English and Punjabi. The purpose of this process assured that the original translations of the interview questions and participants’ responses were indeed conceptually appropriate and accurate (King, Khan, LeBlanc, & Quan, 2011). All translators signed confidentiality agreements.

Data Analysis

In ethnography, data analysis is a cyclical pattern aimed at developing a taxonomy of descriptors of the culture being examined (Spradley, 1980). Initial descriptive observations, hand written as fieldnotes, became data, as per the interview transcripts. All data were first read line by line (by TAE) to look for similar words or meanings and as many codes as possible were identified (Emerson, Fretz, & Shaw, 1995). This initial process informed ongoing observations and interviews. It led to a cyclical reviewing of data to discover more codes (Spradley, 1979, 1980).

As the data collection and analysis proceeded, themes from the data arose. Each sentence that contributed to the theme was classified with a specific code. The data were collated for each code, and then codes of similar data were clustered under larger themes called domains. Thus, the domains were inductively generated from the data and the attributes well defined. During further interviews, questions were asked to test and define the structure of the identified domains (Spradley, 1979). Data generation and analysis ceased when saturation occurred (e.g., no new information was gleaned).
**Reflexivity**

Reflexivity is a key element in qualitative research (Hammersley & Atkinson, 1995). When reflexivity is present, the researcher is able to present participant perspectives that are true and valid; not merely opinions of the researcher (Sandelowski, 1986). Reflexivity can be demonstrated by the researcher’s transparency regarding why the research question was identified, the method employed to address the question, and the researchers own values that may (or may not) influence the findings (Madison, 2005). Throughout the process of this ethnographic study, the fieldworker kept a journal to express thoughts, feelings and frustrations separately from the fieldnotes. This allowed personal feelings to be expressed separately from the data which is important when collecting and analyzing ethnographic data (Emerson et al., 1995).

**Findings**

**Study Sample**

The CAD patients who agreed to be interviewed ranged in age from 65-78 years. A mix of men and women were interviewed, most were married (Table II). Participants had resided in Canada for a range of 10 to 42 years (median 30 years). Half of the participants were born in India or Pakistan, the rest in Tanzania. One potential interview participant declined to participate in the study. No participants refused to be observed.

The patients’ Morisky Medication Adherence Scale scores ranged from zero to five (median 2). Four of the participants scored zero, meaning highly compliant; while only one participant scored five. As a whole, the patient participants were largely adherent.
Medication Adherence

A prominent theme throughout the study was relationships. The themes of ‘relationships with family’, ‘relationships with healthcare providers’ and inter-provider relationships emerged from the data. Other factors included language barriers, memory mechanisms, knowledge regarding medications, as well as complementary and alternative medicine (CAM).

Relationships

**Relationship with family.** Family members were actively involved with participants. They were important to the participant for instrumental and emotional support. Also, participants indicated that family was influential in many aspects of a participant’s life, whether the relative lived within Canada or abroad.

**Immediate and extended family.**

Family members provided tangible assistance such as transportation to appointments. Rarely did a participant come to an appointment alone. Family members (e.g., such as spouses, daughters, sons or grandchildren), also learned about the cardiac medications and encouraged participants to take them.

*Whenever the doctor appoints are, my daughter always is with me…She comes with me and she talks to the doctors, what are the pros and cons and this and that and you know. (Participant #9)*

Family members were used as a facilitator/translator for the participant to ensure medication adherence. Frequently, multiple family members were involved with the patient’s healthcare. This was the case when two sons were both involved with ensuring their mother’s
medications were dispensed correctly. The participant’s first son picked up the blister pack\(^1\) of medications; two days later, a different son returned and questioned whether a prescription change had been incorporated into the blister pack. The change of medication had, in fact, not been incorporated, so the second son returned the medications and had the blister pack remade with the proper medications. The active involvement of family members in the life of this participant required family involvement in discussions, education and the problem solving logistics of medication taking behaviours.

*International family.*

Family living outside of Canada may be immediate or extended relatives. However, families maintain close contact through foreign travel, email, Skype and telephone communication. This regular contact allows for family, whether close by or abroad to influence the opinions and attitudes of the participants about taking medications. Participants indicated that their attitude toward medications is different than the attitude of their relatives residing in South Asian countries. This participant was asked whether he stopped taking his medication when he felt good.

*No, never. Never here but it used to cross my mind in India. Over here I don’t feel that but when I go back to India sometimes I feel that I should…the people there tell us that you should stop ‘You stop, you stop. Why you eating this all the time?’* (Participant #6)

\(^{1}\) “Blister pack”: medications dispensed in a package of preformed plastic. Frequent, four time slots per day (breakfast, lunch, supper, bedtime) of medications are dispensed for four weeks. The blister pack is filled with the specific patient’s medications for a one-month period, generally. Pharmacists prepare the blister packs. Patients are not charged for this service.
Relationship with healthcare providers.

Relationships between the cardiac patients and healthcare providers were important to maintain medication adherence. Cultural values of the patients needed to be recognized by the healthcare provider. Patients returned for appointments when provided with non-judgmental care. These patients sought care from healthcare professionals located close to their communities and valued frequent appointments that ensured relationships were maintained.

Physician relationship with patient.

Participants sought physicians who were willing to build relationships with them. Participants felt that frequent visits to their physician would ensure proper medication treatments, thus they sought regular appointments. These ongoing relationships allowed physicians to become familiar with the patients’ customs, such as vegetarian diets.

One participant, however, felt he neglected seeing his physician because he felt the healthcare system was cumbersome to negotiate relative to what he was used to in his home country and did not see his doctor as he wished.

*I don’t like to go much. I avoid it, you know…I haven’t been back to him now.*

*Its problem to go for me…Dr. never picks up the phone. Then lady pick up the phone. And she say ‘He’s busy, busy, busy, you can’t talk to him’. Now how can you talk to the doctor? First you can’t get hold of him; he’s not going to come home. This is a problem in Canada; this is a big problem to see doctor--like a person like me. The people who can walk, they can go, no trouble. It’s very, very tough and no doctor come to visit here. Back home we use phone, one phone, a doctor is there, in 2 hours he’s there, 3 hours he’s there. Sometimes immediately he comes, in some serious cases. They give prescription. (Participant #2)*
Relationship-building between physician and patient improved when physicians showed patience with and were non-judgmental of lapses in patients’ adherence. For example, during one office visit, the physician identified that the patient had an elevated blood pressure. Upon careful questioning regarding medication adherence, the participant admitted that she had stopped taking her medications to see if there would be any difference to her health. This situation gave the physician an opportunity to reinforce teaching about the importance of medication adherence due to the serious complications that could occur in the future. Additionally, respect, understanding and trust were maintained.

All the physician offices were situated in a location of the city with a high density of South Asian residents. This physical location allowed the South Asian participants easy driving access to the physician offices. For most, they visited the physician frequently, building strong relationships with the physicians. The convenient location of physician services meant that participants were also able to obtain renewal prescriptions with relative ease.

**Pharmacist relationship with patient.**

Participants found a sense of belonging in the pharmacies where they often had the ability to communicate in the same language and by having their customs known. The participants were also drawn to pharmacies that would answer their questions and remain non-judgmental regarding a lack of previous non-adherence. The pharmacies were located conveniently for participants to obtain medications.

Participants who were able to communicate in their own language with a pharmacist or pharmacy technician engaged in a richer conversation and had more conversations regarding their medications than those who did not. Most participants spoke some English. However,
when the spoken English was altered with an accent, the patient had difficulty and understanding diminished. As one participant stated through an interpreter:

_That pharmacy he used to have language problems. He said if it was simple English, simple works (for him). He could understand but then other words he couldn’t understand…sometimes they used French words, or a French accent._

_(Participant #1)_

Participants and pharmacy staff spoke and read a variety of South Asian languages. Yet, communication could still remain problematic. For example, a Gujarati-speaking pharmacy staff member could not communicate effectively with a Punjabi-speaking patient. Some of the South Asian staff only spoke English. Lastly, while many participants spoke some English, they were not fluent in it. The study participants spoke Punjabi but they could not always read Punjabi fluently and thus requested English consents to read or allow family members to read. Therefore communication methods were varied and required effort by the healthcare staff and patience on the part of the participants to ensure good, effective understanding and medication adherence.

The ongoing relationship between pharmacists and participants allowed for long-term education, assessment of treatments and encouragement to remain adherent with medications.

_I had one lady who had an A1c of 10 or something like that before she went away and she was not gonna take her insulin ‘cause she didn’t think she needed it when she was there (in India) ‘cause her sugars were usually good. Her A1c really jumped afterwards. And so that’s a learning curve. You try to show them the cause and effect thing._ (Pharmacist #2)

The A1c value is reflective of an individual’s blood glucose levels over the past 2-3 months (Delamater, 2006). Thus, the pharmacist was able to show the participant that her sugars had not
been well controlled while she was overseas. This allowed the pharmacist to reinforce the need for the patient to remain adherent with her medications, even while traveling.

Participants stated that medications and the process of dispensing medications were different in their home countries. Obtaining medications there could be time consuming as only limited amounts of medication are dispensed at a time. Family members were not always supportive of participants’ spending the required amount of time and energy. Thus, it was common for participants to have many months of medications dispensed in Canada to take while traveling. The pharmacies were accustomed to this request and knew the process to obtain permission in order to dispense this larger than normal amount of medication. The service provided by their local pharmacies increased the likelihood of medication adherence, as medications were also not trusted in the foreign countries. As one participant stated through an interpreter:

*Whenever he travels (to India), he always takes his medicine. He takes all his medications for the six months he stays there…he says not exactly the same (medication is available there), like sometimes you can get it lower, like milligrams or higher milligrams, but exactly the same, you don’t know…He take them (the medication from this pharmacy with him)…Maybe fake (in India), like they have that medication is better or maybe they think it’s hard to communicate (in India) and they won’t know. They just want to know, see what they’re getting. They know they can get the right stuff here.* (Participant #2)

Another participant described why he takes his medications with him when traveling overseas. He was concerned that the quality of the medications dispensed in India was not the same quality as those he receives in Canada.
You can’t get those ones (medications) over there. Not the same one, but generic. All the medicines are from India. It’s one-quarter the price over there but it’s all generic. Actually (the medication) doesn’t have an effect like what these have. But it’s a substitute, like, if you don’t get it at this (pharmacy) you have it there (if you need it). (Participant #5)

Pharmacies were located in the same community as the participants lived. Pharmacies in this section of the city that accommodated for the South Asian patient helped to increase the patient’s adherence to medications. Adherence enablers included the attempts to communicate in a language understood by the patient and dispensing extended scripts for patients travelling overseas for longer periods of time. Additionally, pharmacies included the patients’ family, anticipating one of them may pick up medications on behalf of their family member.

**Inter-provider relationships**

**Physician relationship with pharmacist.**

A collaborative relationship and good communication between a physician and pharmacist was associated with enhanced medication adherence of participants. This relationship enabled information exchange between pharmacists and physicians in order to clarify prescriptions or provide information regarding medications filled by the patients. In addition, pharmacists’ teaching was coordinated with physician teaching to utilize the expertise of pharmacists in counselling patients about their medications.

One pharmacist spoke about her relationship with physicians and the impact on his patients.

“I’m collaborating with physicians…the ones that know me and my strengths…phone and tell me to keep an eye on these patients.” (Pharmacist #1)
The pharmacist had opportunities to interact with patients in a different manner than physicians. It was the communication that resulted from the relationship between the physician and pharmacist that could problem solve factors that otherwise would lead to medication non-adherence. The lack of a collaborative relationship could cause difficulty.

*The dietician says, ‘you’re on the wrong insulins, you need to go speak to your pharmacist.’ So he (the patient) panicked and then he goes and runs into the doctor’s office. The doctor sends the patient to me to look after. I booked an appointment (and straightened out the situation with the patient) but it would be nicer if we were able to communicate together and everyone knew what the healthcare personnel were doing so that when the patient goes to the diabetes educator, they know what we’ve been doing with the patient.* (Pharmacist #1)

**Memory Mechanisms**

Participants utilized various mechanisms as reminders to take their medications. Most of the methods were low in technology and consisted of developing helpful habits. A participant spoke through an interpreter about how he remembers to take his medications:

*He used to write it in Punjabi on the vial, like this one is for morning, this one is for evening, so he used to read the vial and take accordingly. He had the vials on his table.* (Participant #1)

Another participant used a weekly medication organizer to remember his medications. Patients frequently used a ‘box’ or dosette to organize medications. This box contained seven rows, one for each day of the week and two slots per row. The top row was for medication required in the mornings, the bottom row for medications in the evenings.
I have it written down. I have bought and I put my medicine in there for the week. When I put them in for the week, I don’t forget…Sometimes before, when I didn’t use that box I would forget, I would not remember. I would think that I already had my medication, but I hadn’t take it. Ever since I have started using the box…she has a different box and I have a different box. I put my medicine in for the week. Put them in for one week. I put another batch after one week. Then I know, which ones I have left and which ones I have not.

(Participant #6)

Taking medications needs to be incorporated into a person’s routine to be remembered. This participant talks about his morning routine.

“In the morning after taking a shower, brushing, eating bread and praying. After that I take my medicine, and then I walk for about 30-45 minutes.”

(Participant #8)

Study participants’ knowledge regarding medication

Participants’ knowledge regarding their medications varied. Some participants knew the pill size, shape, colour and why the medication was ordered, others knew very little information.

One participant described his medications this way:

“Lipitor is, it’s a big very thick one, that’s Lipitor. That metoprolol is the tiny one. And ramipril is the capsule. It is red and white one, so I remember and aspirin is in that bottle.” (Participant #5).

Participants receiving blister packs had a different kind of knowledge about their medication. Many medications were packaged together in one ‘blister’, therefore, participants could not identify each medication separately. Rather, the participant knew the medication by colour,
name or purpose but could not link the information together. Therefore a new medication may be identified only by colour. In the same way, a change of medication may be identified by a different colour of medication in the ‘blister’. One participant knew that a certain medication made her feel unwell and stopped taking it due to the side-effects. She had figured out it was the “new small, white pills”. She then removed two of the three small white pills each day from the blister pack. She brought a bag of unused white pills along with the rest of her blister pack to the physician to get her prescriptions changed. The daughter-in-law accompanied the participant to the physician’s office and interpreted:

The medication the doctor giving her not working. I don’t know (what the white pill is). The doctor said it will help on the pain. She (participant) say, ‘I take this pill then feels dizzy’. She takes one is okay. She take three capsule then she feels dizzy. (Participant #4)

Some participants were alarmed if their medication had been changed to a different colour or shape. One participant described his fear of being dispensed the incorrect medication for his family member.

One day they send a different colour package so I say, these are the wrong medication. They put somebody’s medication in these packets. So I called them. I said, you guys better come here, I can’t give this medicine to her. Then one of the guys came and he says, ‘Why’? I said why this pink?...That’s why, they are sending it and telling me every time they change the tablet they let me know first. (Participant #2)


**Alternative Therapies**

Participants frequently utilized complementary and alternative medicines (CAM) in addition to cardiac medications for treatment. Patients used these treatments while in India because they were not available in Canada. Participants believed the healing qualities of CAM treatments were related to the popular belief in the healing ability of heat. Participants also talked about the damage that the Canadian cold weather had on their health, thus they used CAM while in the warm climate to maximize their health. Belief in the healing ability of heat, brought about questioning from family members as to why participants needed to continue taking their medications in the hot weather while in India.

In addition, participants used terminology related to heat and the viscosity of blood as physiological reasons for sickness or health. This participant did not understand that the stents had re-occluded but rather believed the procedure needed to be redone due to the stents melting away.

*The arteries are blocked. So then they put stents in me. I was feeling all right and normal. Then in two months, the stents…I don’t know how they melted. They put in stents. Yes. They put them in again.* (Participant #6)

The participant spoke of another time when heat healed the cardiac rhythm problem.

*The rhythm increased, then they took me to the hospital. There were three or four doctors. One injected me here, the other injected here and so on…my body got warm. They told me that my body would get hot. My body got warm and my rhythm was all right.* (Participant #6)
Thus, patients and family members gave indications that heat had healing powers. India, Pakistan and Tanzania had warm weather that could decrease the sickness and the amount of medications that patients required.

**Discussion**

Factors related to medication adherence frequently have been investigated with a focus on the patient. Our investigation widened the focus to include factors surrounding the patient (World Health Organization, 2003). In the past, ‘blame’ for non-adherence was largely placed on patients (World Health Organization, 2003). We identified that the support systems for South Asian patients play a key role and are extremely valuable in enabling patients to continue taking their medications.

**Relationships**

Family members provided foundational support systems that encouraged patients to remain adherent to their medications. The literature indicates that South Asians who have support from their families indeed have increased adherence to medications (Hashmi et al., 2007; Qureshi, Hatcher, Chaturvedi, & Jafar, 2007) but how this support makes a difference had not been explored. Our investigation revealed that supportive family members provide instrumental support. Family members need to be included in the ongoing treatment that South Asian patients receive, as they are a major driving factor for the patient to remain adherent with their medications.

The support given to South Asian cardiac patients by families has similarities to how parents support their children taking chronic medications (Matsui, 2007). Parents provide instrumental support by transporting children to appointments and incorporating medications into daily routines (Nevins, 2005). Collaborative goals between the healthcare provider, family and
pediatric patient are encouraged to increase medication adherence (Nevins, 2005). Conversely, when South Asian patients do not have family support that the cardiac medication is necessary, provisions may not be made to understand the medication or to obtain it.

Relationships with healthcare providers are also an important element of adherence. Patients hope that medication will reinstate the healthy body lost to disease. However, patients resist the idea of taking medications containing foreign substances for the rest of their lives (Pound et al., 2005). Qureshi et al. (2007) and Ponnusankar et al. (2004) found that adherence for South Asian cardiac patients increased when physicians or pharmacists counselled patients. Specifically, explaining to the patient why their diagnosis required medication had the greatest impact on increasing adherence (Qureshi et al., 2007). Naïve scientist is a term used when patients modify their medication regime to see if a difference in their health is noticeable (Siegel, Schrimshaw, & Dean, 1999). When a patient is on life-long medication, arguably some form of this experimentation is likely to take place. Therefore, healthcare teams addressing medication adherence need to be aware of their patients’ concerns and willing to discuss the impact of medications.

Our study also revealed that South Asian patients needed ongoing relationships, established through frequent visits with the healthcare team (physicians and pharmacists) to maintain adherence with their medications. South Asian patients have been known to book frequent physician visits relative to their European counterparts. Chaturvedi, Rai and Ben-Shlomo (1997) found 43% of European men saw their general practitioner two or more times per year, while 78% and 68% of Hindu and Sikh men respectively did so. Women had higher rates of physician visits: 74% for Europeans, 88% for Hindus and 76% for Sikhs. Establishing a relationship through frequent visits allows the healthcare team to remind patients to take their
medication, explain why and answer patient and family members’ questions. These conversations become more difficult when language barriers exist.

Given the fiscal restraint in the current healthcare system, providers and administrators need to address the cost of frequent physician visits. Physician offices need to be aware of the desire for ongoing relationships from the South Asian population. This may be addressed in a variety of ways. Booking a patient into a future appointment before leaving the office may bridge the relationship gap until that date, knowing that future concerns will be addressed. The physician office needs to look at ways of promoting an identity as a healthcare team, whereby a nurse, specially trained in chronic disease management could also address the concerns of the patient in between appointments and on an ongoing basis.

Healthcare professionals need to understand that the medications themselves and process of obtaining medications may be different in South Asian countries. The Canadian healthcare system is relatively easy to access and is free of charge at the point of care (being publicly funded through tax dollars). The costs of medications are frequently covered by insurance plans through a person’s work or by individuals buying insurance. This contrasts with the system that immigrants from Pakistan and India are accustomed to in their countries of origin, where one pays cash for all aspects of healthcare, including physician consultation and medications. Good relationships with physicians and pharmacists (and other healthcare staff) may meet the patients’ need to feel confident in their new healthcare system.

**Memory Mechanisms for taking Medications**

Forgetting to take medications is a major reason for non-adherence (Almas, Hameed, Ahmed, & Islam, 2006; Ponnusankar et al., 2004). Our, as yet unpublished, work has also revealed that multiple methods of reminders were utilized by South Asian patients in order to
remain adherent (Ens et al., unpublished). No one solution works for everyone. Taking medications around daily routine activities such as eating and prayers could be helpful in forming habits and remembering to take medications (Almas et al., 2006).

A major factor for medication adherence is remembering to take the right medications at the right time, each day. As the days and weeks progress, the challenge for the patient is how to confirm if a medication was taken for that particular day. Patients were frequently using either a dosette or blister packaging to identify that medications were taken each day. Individual patients need to find a method that works for them. The healthcare professional needs to discuss with the patient what kinds of routine works to ensure medications are taken.

**Patient’s Medication Knowledge**

The World Health Organization recognizes that patients are identified as one of the many dimensions related to medication adherence (2003). A strong belief held by many healthcare professionals is that when patients are educated about their medications, adherence will follow (World Health Organization, 2003). Hashmi (2007) found that South Asian patients had a low level of knowledge regarding CVD and why medications were used to treat the disease. Only 50% of South Asian participants in a study by Hakonsen (2011) understood that chronic disease would be treated with medications, as opposed to other forms of medical treatment. Patients with poor levels of knowledge were also found to have low levels of adherence (Saleem, Hassali, Shafie, Awad, & Bashir, 2011). In this study, a relationship with a healthcare professional that provided information to the patient helped overcome the lack of knowledge by the patient. The relationship also provided timely introduction of knowledge when the patient seemed most receptive.
**Complementary and Alternative Medicine**

South Asian patients may be utilizing Ayurvedia\(^2\) or allopathy to compliment Western medicine (Saleem et al., 2011). It is important to understand that many of these alternative therapies are utilized when the patient returns to their home country for visiting and not necessarily as an ongoing practice here in Canada. This contrasts with Chinese patients whose medication adherence was decreased when taking Western medication (Li, Stewart, Stotts, & Froelicher, 2006). The Chinese believed that herbal medications were a more effective treatment than Western medication and chose to take them instead (Li et al., 2006). Whereas, the South Asians believe that the CAM and medications may be utilized simultaneously.

**Study Limitations**

There are a few limitations to this study. Though data saturation occurred, there were a small number of participants, the physical location of data collection was narrow, and the cardiac patients were generally adherent to their medication. Thus, one should be careful to not generalize the study findings. Morisky’s medication adherence scale has not been validated in the South Asian cardiac population. There is not a medication adherence tool that has been validated. This one was chosen due to its validity and reliability in other populations. Finally, the research also focused on participants who visited their healthcare providers. This is not representative of South Asian cardiac patients who do not go see their physician or do not fill medication prescriptions.

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\(^2\) Ayurvedia is a Hindi system of medicine which encompasses an ancient perspective about the body and health. Practitioners of Ayurveda also provide certain medications-known to be high in some toxic elements.
Conclusion

Recommendations for practice

South Asians have higher rates of CAD than people of other ethnicities. Secondary prevention of CAD requires taking multiple long-term medications over a lifetime. South Asians residing outside of their home countries have many barriers to adherence (e.g., language, a change in culture and healthcare systems, and a lack of knowledge about the need for medication). Healthcare professionals can help overcome these barriers by making an enhanced effort to build relationships. A shift in power needs to be recognized by the healthcare team as medication consumption is a patient’s decision. Providers can support patients by exploring their views and addressing their concerns.

Patients need to be reminded that medication is the primary method of ongoing treatment for the CAD. These medications often require lifelong prescriptions. Thus there are many opportunities to reinforce knowledge about the medications and their use. South Asian cardiac patients book frequent appointments with healthcare providers. Providers may utilize these appointments to emphasize key teaching points (e.g., the need to continue medications when travelling overseas to hot countries, that the ongoing treatment of CAD is treated by medications and giving clear directions to the patient when the next appointment should be so that a future appointment can be booked).

Families need to be included in the discussion of CAD and medications. Family members provide many aspects of care that may be fundamental to medication adherence. An assessment of a patient’s support systems (probably meaning the availability of family to help out) should be undertaken. The results should be interpreted by the patient, as to whether the support is adequate or not. An inadequate support system may mean a higher reliance on the
healthcare team resulting in even more frequent appointments. This may be mitigated by implementing a team approach in the physician office, such as chronic disease nurses.

**Dimensions of Medication Adherence**

The medication adherence framework utilized in this study was based on the WHO (2003) and Barroletti and Dell’Orfano (2010). Previously, much emphasis has been placed on educating the patient about a medication, with the assumption that adherence would follow. This framework guided exploration of factors from the patients’ perspective. Since it is the patients who will decide to take or not to take their medications, their viewpoint and concerns need to be addressed by the healthcare team.

**Future Inquiries**

Medication adherence in South Asian cardiac patients was explored. Further investigation should include exploration of what patients view as important knowledge about their medications. This study revealed relationships are important to this particular patient. A future study should explore who other cardiac patients view as important to their support system and how it impacts medication adherence. The simple memory mechanisms found in this study may also be frequently utilized in other cardiac populations and need to be explored. Medication adherence needs to continue to be explored from the perspective of the patient to learn how we as healthcare providers can better facilitate medication adherence.

Finally, people are living longer with chronic illness such as CAD (Wielgosz et al., 2009). A communication tool needs to be developed and utilized between healthcare providers outside the acute care setting to improve communication between providers and to provide patients with cohesive advice and decrease on healthcare costs.
Table I

Dimensions of Medication Adherence

World Health Organization, 2003; (Baroletti & Dell'Orfano, 2010)

<table>
<thead>
<tr>
<th>Category</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Factors</td>
<td>• motivation</td>
</tr>
<tr>
<td></td>
<td>• communication</td>
</tr>
<tr>
<td>Healthcare System Factors</td>
<td>• lack of training to deal with chronic conditions</td>
</tr>
<tr>
<td></td>
<td>• lack of performance reviews of healthcare personnel</td>
</tr>
<tr>
<td>Social/ Economic Factors</td>
<td>• low socioeconomic status or unemployment</td>
</tr>
<tr>
<td></td>
<td>• low literacy</td>
</tr>
<tr>
<td></td>
<td>• lack of social support</td>
</tr>
<tr>
<td></td>
<td>• high cost of medications</td>
</tr>
<tr>
<td>Condition Related Factors</td>
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</tr>
<tr>
<td></td>
<td>• severity of symptoms</td>
</tr>
<tr>
<td>Therapy Related Factors</td>
<td>• number of times per day a medication is required</td>
</tr>
<tr>
<td></td>
<td>• side-effects from the medication</td>
</tr>
<tr>
<td></td>
<td>• required length of treatment</td>
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</table>
Table II

Study Sample

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Gender</th>
<th>Marital Status</th>
<th>Years residing in Canada</th>
<th>Morisky score</th>
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<td>M</td>
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<td>M</td>
<td>D</td>
<td>42</td>
<td>0</td>
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<tr>
<td>Participant #4</td>
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<td>W</td>
<td>W</td>
<td>23</td>
<td>3</td>
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<tr>
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<td>M</td>
<td>M</td>
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<td>4</td>
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<tr>
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<td>M</td>
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<tr>
<td>Participant #7</td>
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<td>M</td>
<td>19</td>
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<td>Participant #8</td>
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<td>W</td>
<td>W</td>
<td>32</td>
<td>5</td>
</tr>
</tbody>
</table>

1 Man (M) or Woman (W)

2 Single (S), Married (M) or Divorced (D)
References


IMS Brogran Disease Dynamics. (Feb 2011). Canadian Disease and Therapeutic Index, Year Ending 2010. Canadian Pharmaceutical Marketing.


CHAPTER 5: DISCUSSION

Factors related to medication adherence among the South Asian cardiac population were explored in a systematic review of the literature and an ethnographic study. Cardiovascular disease (of which CAD is a major contributor) incurs the largest expenditure of any other disease in Canada (Wielgosz et al., 2009). Medical management is the treatment of choice for the ongoing treatment of CAD to maintain wellbeing and quality of life (Smith et al., 2006). When CAD patients adhere to prescribed medications, overall healthcare costs are reduced (Pittman, Chen, Bowlin, & Foody, 2011). Patients choose (or choose not to) take their medications. Therefore, individual patients predominantly control medication adherence.

South Asian immigrants and those whose ancestry is South Asian represent an increasing proportion of the Canadian population (Statistics Canada, 2007). As identified earlier, people of South Asian origin are more likely to develop CAD and do so at a younger age than their Caucasian counterparts. Further, there is some evidence to suggest that they may also be less likely to adhere to an ongoing regimen of medications (Lai et al., 2008). Thus, it has been important to examine the factors that influence medication adherence of South Asian cardiac patients.

The Literature Review

The narrative systematic review of the literature revealed a small number of studies exploring factors associated with medication adherence among the South Asian cardiac population. The literature search included the years 1980 to 2013; half of the studies were conducted within the last five years. The use of medications as a cardio-protective mechanism has been advocated for decades (Lonn et al., 1994). Further, it has long been identified that South Asians have high rates of morbidity and mortality from CAD (Sheth, Jair, Nargundkar,
Anand, & Yusuf, 1999). Thus, studying medication adherence among South Asian cardiac patients should have become a priority health research concern. It has not. Further, methodological, conceptual and cultural difficulties impede the validity and uptake of current study findings.

Measurement of pertinent details regarding medication adherence in this ethnic group are missing in the current research. For example, medication adherence needs to be specifically defined (e.g., 80% of medications are consumed as prescribed) to enable comparison of one study to the next (Bharucha & Kuruvilla, 2003). Medication adherence declines after six months of prescription (Joshi, Salkar, & Heller, 1996). Generally, the length of time that medication adherence was measured was inadequate to fully explore it. The majority of studies had small sample sizes making it difficult to examine the power to determine group differences or to be confident in the study’s generalizability. There was also inconsistency in the focus of the studies [e.g. medication adherence (Ponnusankar, Surulivelrajan, Anandamoorthy, & Suress, 2004) vs generic substitution of cardiac medications for immigrants (Håkonsen & Toverud, 2011)].

Certain barriers regarding medication adherence in the South Asian population seem to be similar to those identified by the WHO (2003). Factors such as a lack of patient knowledge (Hashmi et al., 2007), the cost of medications to the patient (Dennis et al., 2011), difficulty in remembering to take the medications (Ponnusankar et al., 2004), and the interruption associated with taking medications multiple times throughout the day (Palanisamy & Sumathy, 2009) have been identified in studies focusing on South Asian cardiac patients. These findings could lead one to conclude that there are no ethnic-specific factors associated with South Asians’ cardiac medication adherence. However, other findings indicated that unique situations may exist for the South Asian cardiac population. There are cultural factors that indeed influence medication in
South Asian cardiac patients. These patients have often come from healthcare systems where medications are not trusted and the navigation through the system is quite different than in Canada. Adjusting to a new country with new systems requires that one adjusts their beliefs and standards.

South Asians typically have strong ties with family members in Canada and with those that remain in their home countries. Family members are often key positive mediators of medication adherence. However, the impact of family members who are not in favour of medication use has not been well examined. South Asians engage in long-term travel to visit family members residing in their home countries; which is not seen in patients of other ethnic groups. How this impacts medication adherence is only beginning to be examined (Håkonsen & Toverud, 2011). Ten studies were undertaken in South Asian countries. These studies lacked detail regarding the rate of medication adherence (Bharucha & Kuruvilla, 2003) and the classification of cardiac medications (Almas, Hameed, Ahmed, & Islam, 2006). Though potentially helpful, the salient issues related to immigration or language barriers (in the Canadian context) are not addressed in these studies.

The earlier the CAD diagnosis, the greater the length of one’s life spent taking medications. None of the studies reviewed addressed matters related to the number of years that South Asian cardiac patients need to be on medications. For example, the ongoing adherence to medications needs to be examined.

There remain a number of gaps in the literature regarding the factors that influence South Asian CAD patients adhering to cardiac medications. Specifically, research has not been focused on the culturally-based factors that influence South Asians who have immigrated to a western country in taking their cardiac medications. The second study can begin to fill that gap.
The Ethnographic Study

Using ethnography enabled a culturally-based exploration of factors for medication adherence from the perspective of the South Asian cardiac patient. This study will provide beginning information regarding the general and unique factors that South Asian cardiac patients who have immigrated to a western country face when adhering to their cardiac medications.

Chronic cardiac conditions will be the focus in cardiology research and practice over the next number of decades (Provost, Pineault, Tousignant, Hamel, & Da Silva, 2011). The extensive success in decreasing CAD mortality has led to a large portion of Canadians living with the disease (Wielgosz et al., 2009). It is imperative that healthcare professionals partner with patients while they live through this journey. Medication adherence is one of the key factors in this (CAD) chronic condition (Perreault et al., 2010). When healthcare providers understand the perspective of the patients, they will be able to optimally support the patient with chronic cardiac management.

A key factor of medication adherence was the relationship that participants had with their family. Families of South Asian immigrants have a strong influence either to support or discourage the patient in taking their medications (Qureshi, Hatcher, Chaturvedi, & Jafar, 2007). This is due to both the emotional and instrumental support given. Therefore, the healthcare team needs to prioritize educating family members, along with the patient.

Ongoing relationships between the patient and healthcare provider gave the patient confidence that medication is indeed required (Ponnusankar et al., 2004; Qureshi et al., 2007). Frequent visits commonly occurred to maintain this relationship. The South Asian immigrants have been known to visit their primary physicians more often than European patients (Nish Chaturvedi, Rai, & Ben-Shlomo, 1997). Medication adherence increases when physicians and
pharmacists counsel patients regarding why the medication is necessary. In today’s healthcare system, the cost associated with this activity may be excessive and the teaching may be delivered more efficiently through other healthcare personnel (e.g., advanced practice nurse).

Forgetfulness continues to be a factor for medication non-adherence (Almas et al., 2006). This study demonstrated that participants utilized a variety of methods as reminders. Healthcare personnel need to work with patients in developing methods specific to the individual’s life that promotes routine.

Participant knowledge about the medications varied. Identifying medications by size and colour is known to be an important example of patient knowledge (Håkonsen & Toverud, 2011). It was anxiety provoking when medications were changed without the patient’s awareness, as they could no longer identify the medication. In contrast, there was a noticeable lack of knowledge in those whose medication was packaged in blister packs. Many participants lacked detailed knowledge of how the medication physiologically affected their bodies. The issue of what knowledge is important to the patient should be investigated in the future.

Participants utilized complementary and alternative medicine (CAM) in addition to CAD medications. Primarily CAM was sought out when the participants returned to India or Pakistan where both the hot temperature and CAM were considered to have healing powers. This is in contrast to Chinese patients for example, who may choose herbal medications over Western medications (Li, Stewart, Stotts, & Froelicher, 2006). In practice, the CAD patient needs to be reminded to continue with medications overseas.

**Dimensions of Medication Adherence**

The medication adherence framework utilized in this study was based on the WHO (2003) and Baroletti and Dell’Orfano (2010). Previously, much emphasis has been placed on
educating the patient about a medication, with the assumption that adherence would follow. The five dimensions of the framework (patient related, socioeconomic, healthcare system, condition related and therapy related factors) provide a greater understanding of the barriers that patients face. Patient factors such as language barriers and forgetfulness are easily identified (Soliman et al., 2011; World Health Organization, 2003). This study has exposed that healthcare professionals may not know what kind of knowledge is most helpful to the patient. Further exploration of the patient’s viewpoint will be helpful. The socioeconomic status of an immigrant is often demographically in a lower income and job title (Tran, 2005). However, the support offered by family members provides a means to mitigate these factors. Communication breakdowns and non-cohesive team members are healthcare team and system factors that cause barriers to adherence. These are barriers that need to be addressed within the system, if patients are expected to respect healthcare providers’ expertise and adhere to recommendations (i.e., taking medications). The condition and therapy related factors for CAD have not been fully addressed by the healthcare community. Taking medications for the remainder of one’s life (frequently requiring 20-40 years of medication use) is not adequately captured in studies that frequently capture data from less than one to five years. A patient that is completely adherent to medications for the first year following the CAD diagnosis should have different sequelae than someone who takes 50% of their medications for 30 years. Future long-term studies are needed to follow up, especially with the South Asian population, as they expect significant increases in CAD incidence rates.

**Recommendations for Practice**

South Asians residing outside their home countries have many barriers to adherence (e.g., language, a change in culture and healthcare systems, and a lack of knowledge about the need for
medication) (Håkonsen & Toverud, 2011; Hempler, Diderichsen, Larsen, Ladelund, & Jorgensen, 2010; Lai et al., 2011). Based on the findings from the ethnographic study, healthcare professionals can help South Asian cardiac patients overcome these barriers by making an enhanced effort to build relationships. A shift in power needs to be recognized by the healthcare team as medication consumption is a patient’s decision and occurs in the context of patients’ everyday lives (Matthews & Brown, 2013). Providers can support patients by exploring their views and addressing concerns.

Nurses are in an ideal position to address this important void. The utilization of chronic disease nurses in primary care physician offices or primary care networks should benefit the patient in numerous ways. Frequent appointments to see physicians are a drain to the financial well-being of our healthcare system. Prescribing medications are only a small part of the reason that patients come to healthcare appointments. Nurses assess patients in terms of physiological needs and psychosocial needs (Matthews & Brown, 2013). Thus, the nurse is an ideal professional to form relationships with the patient and the family. Social support could be assessed and any issues with a patient’s routine that posed difficulties in maintaining adherence could be discussed. Assessment of medication adherence from year to year should be done as many South Asian patients will be taking medications for decades. The nurse is positioned to address concerns and problem solve with the patient and family about taking medications overseas. Patients that have difficulty navigating through system could be given extra assistance to ensure success (Matthews & Brown, 2013).

However, the realization of providing support to South Asian cardiac patient by nurses could be derailed. The nurse, physician or pharmacist needs to be willing to collaborate within the healthcare team to ensure consistent messaging to the patient (Merkeley & Fraser, 2008).
Secondly, the nurse needs to be presented as a valued and equal partner of the healthcare team to the patient. Without the patient feeling that the nurse has the ability to advocate on behalf of the patient, frequent physician appointments will continue to occur (Pullon, McKinlay, Stubbe, Todd, & Badenhorst, 2011). Lastly, in dealing with a South Asian population, it would be valuable, and almost essential to have a nurse who spoke one of the South Asian languages.

Another role of the advanced practice nurse is in educating patients. When undergraduate and graduate nurses are educated, they need to be informed about the changing demographics of Canadian society (specifically the growing South Asian population) (Tran, 2005) and how family support plays a vital role in these patients continued health and well-being (Grewal, Stewart, & Grace, 2010). This should impact the nurse’s practice, whether in acute care or in the community. Cardiac patients receive important treatments while in hospital but patients live most of their lives with this chronic disease in the community (Wielgosz et al., 2009). Therefore nurses will encounter South Asian CAD patients and their families in whichever field they practice.

**Future Inquiries**

Medication adherence is a multi-faceted and complex phenomenon. Further investigation should include examining patients’ views regarding what information they deem important about their cardiac medications. Healthcare professionals believe that patients should know about the purpose of specific medications and their potential side-effects. This study has revealed that patients may view other aspects of medication knowledge as valuable. Knowledge that is important to the patient may include the colour of the medication or how to integrate taking their medications into a daily routine. Exploring issues surrounding what the patients’ value in medication information would emphasize that power rests with patients in the decision of
whether to take their medications or not. Medication adherence needs to continue to be explored from the perspective of the patient to learn how healthcare providers can better facilitate it.

Finally, people are living longer with chronic illnesses such as CAD (Wielgosz et al., 2009). A communication tool needs to be developed and utilized between healthcare providers outside the acute care setting to improve communication. This would provide patients with cohesive advice and decrease on healthcare costs.

**Conclusion**

This thesis highlights the varying quality of research available regarding the factors associated with cardiac medication adherence in South Asian cardiac patients. The ethnographic study revealed that relationships are key elements to achieving medication adherence. The frequent visits and resulting costs to the healthcare system due to ongoing relationships with healthcare providers could be mitigated by implementing chronic disease nurses in as part of the primary care, instead of physicians.
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6736(02)09327-3


December 10, 2011

Kathryn King-Shier, RN, PhD
Professor and Heritage Health Scholar
Faculty of Nursing, University of Calgary
2500 University Drive NW
Calgary, AB T2N 1N4

Dear Ms. King-Shier:

I have discussed Ms. Ens' research regarding attitudes toward medications with Ms. Ens. It appears to be very interesting; and, the outcomes should be useful in improving patient care.

It will be a pleasure to allow Ms. Ens to spend time in Pharmacy Plus for the purposes of observing interactions between pharmacists and South Asian cardiac patients (subject to their consent).

Sincerely yours,

[Signature]

Nermen Kassam B. Sc. Pharm.
APPENDIX B PHYSICAN CONSENT

UNIVERSITY OF CALGARY
FACULTY OF NURSING

Informed Consent Form (Physicians/Pharmacists-observations)

PROJECT TITLE: What are the factors that influence South Asian people with coronary artery disease taking (or not) their cardiac medications?

INVESTIGATORS: Kathryn King-Shier, RN, PhD
              Twyla Ens, RN, BSN
              Cydnee Seneviratne, RN, PhD
              Charlotte Jones, MD, PhD

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BACKGROUND
Patients with cardiac disease are often prescribed medications to improve their symptom profile as well as heart function. However, cardiac patients sometimes do not take their medications as prescribed. The reasons for this are often related to how people understand their heart disease and the function that medicines might have; and these understandings can be related to people’s culture. The researchers would like to develop a better understanding of this occurrence for South Asian cardiac patients by interviewing them as well as healthcare providers who work with this population to learn about their perspectives.

WHAT IS THE PURPOSE OF THE STUDY?
This study is being done as part of Ms. Twyla Ens’ Master of Nursing Program. The purpose of the study is to gain a better understanding of the factors that influence South Asian heart patients taking or not taking their prescribed heart medicines.

WHAT WOULD I HAVE TO DO?
As a physician or pharmacist who works with South Asian cardiac patients, you will be asked to allow the researchers to observe your interactions with South Asian patients who have been prescribed cardiac medications. The researchers will not interfere with the interaction between you and the patient, and will quietly make notes about what she is observing. The number of interactions observed will depend on the availability of South Asian cardiac patients and the ease at which these observations can be made in your practice. That will be up to you.

Ethics ID: 24310
Study Title: What are the factors that influence South Asian people with coronary artery disease taking (or not) their cardiac medications?
PI: Dr. Kathryn King-Shier
Version Number/Date: 1/Nov 2011
Page: 1/3
WHAT ARE THE RISKS?
There are no particular risks to participating in this study. However, you could become tired or fatigued. If this becomes the case, let the researcher know and the observation will be stopped. The observations can resume at another convenient time. You may choose not to the observations by telling the researcher.

WILL I BENEFIT IF I TAKE PART?
If you agree to participate in this study there will be no direct benefit to you. However, the information we get from this study may help us to provide better care in the future for patients with heart disease.

DO I HAVE TO PARTICIPATE?
You are under no obligation to participate in this study. Participating in this study is voluntary and you may withdraw from the study at any time. If you wish to withdraw from the study, you may do so by telling the researcher.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?
You will not be paid for this element of the study.

WILL MY RECORDS BE KEPT PRIVATE?
Only the researchers will have access to the information you provide. It is common when writing about the findings of a study like this to use quotations from the study participants. No information that would identify you from the other study participants will be used.

SIGNATURES
Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. If you have further questions concerning matters related to this research, please contact:

    Dr. Kathryn King-Shier (403) 220-4643

If you have any questions concerning your rights as a possible participant in this research, please contact The Director, Office of Medical Bioethics, University of Calgary, at 403-220-7990
The University of Calgary Conjoint Health Research Ethics Board has approved this research study.  
A signed copy of this consent form has been given to you to keep for your records and reference.  

Participant’s Name  Signature and Date

Investigator/Delegate’s Name  Signature and Date

Witness’ Name  Signature and Date

Ethics ID: 24310  
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PI: Dr. Kathryn King-Shier  
Version Number/Date: 1/Nov 2011  
Page: 3/3
APPENDIX C PATIENT CONSENT

UNIVERSITY OF CALGARY
FACULTY OF NURSING
Informed Consent Form (Patients)

PROJECT TITLE: What are the factors that influence South Asian people with coronary artery disease taking (or not) their cardiac medications?

INVESTIGATORS: Kathryn King-Shier, RN, PhD
Twyla Ens, RN, BSN
Cydnee Seneviratne, RN, PhD
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BACKGROUND
When someone has heart disease, they are often prescribed medications to reduce the symptoms and help their heart function at its best. However, heart patients sometimes do not take their medications as prescribed. The reasons for this are often related to how people understand their heart disease and the function that medicines might have; and these understandings can be related to people’s culture. The researchers would like to develop a better understanding of this occurrence for South Asian heart patients by interviewing them about this topic. Physicians and pharmacists who work with South Asian heart patients will also be interviewed for their perspectives.

WHAT IS THE PURPOSE OF THE STUDY?
This study is being done as part of Ms. Twyla Ens’ Master of Nursing Program. The purpose of the study is to gain a better understanding of the factors that influence South Asian heart patients taking or not taking their prescribed heart medicines.

WHAT WOULD I HAVE TO DO?
As a South Asian person who has heart disease and who is visiting their doctor or pharmacist, you will be asked to allow the researcher to observe your interactions with the doctor or pharmacist. The researchers will not interfere with the interaction between you and your doctor or pharmacist, and will quietly make notes about what she is observing. This observation will occur only once at either your doctor, pharmacist or both visits.

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There are no particular risks to participating in this study. However, you could become tired or fatigued. If this becomes the case, let the researcher know and the observation will be stopped. The observations can resume at another convenient time. You may choose not to the observations by telling the researcher.

WILL I BENEFIT IF I TAKE PART?
If you agree to participate in this study there will be no direct benefit to you. However, the information we get from this study may help us to provide better care in the future for patients with heart disease.

DO I HAVE TO PARTICIPATE?
You are under no obligation to participate in this study. Participating in this study is voluntary and you may withdraw from the study at any time without jeopardizing your health care. If you wish to withdraw from the study, you may do so by telling the researcher.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?
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Version Number/Date: 1/Nov 2011
Page: 3/3
APPENDIX D: PATIENT INTERVIEW CONSENT

UNIVERSITY OF CALGARY
FACULTY OF NURSING

Informed Consent Form (Physicians/Pharmacists)

PROJECT TITLE: What are the factors that influence South Asian people with coronary artery disease taking (or not) their cardiac medications?

INVESTIGATORS: Kathryn King-Shier, RN, PhD
               Twyla Ens, RN, BSN
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BACKGROUND
Patients with cardiac disease are often prescribed medications to improve their symptom profile as well as heart function. However, cardiac patients sometimes do not take their medications as prescribed. The reasons for this are often related to how people understand their heart disease and the function that medicines might have; and these understandings can be related to people’s culture. The researchers would like to develop a better understanding of this occurrence for South Asian cardiac patients by interviewing them as well as healthcare providers who work with this population to learn about their perspectives.

WHAT IS THE PURPOSE OF THE STUDY?
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WHAT WOULD I HAVE TO DO?
As a physician or pharmacist who works with South Asian cardiac patients, you will be asked to participate in an interview. The researchers will ask questions about your experience in working with South Asian cardiac patients, your perceptions regarding their medication adherence as well as the factors that you believe influence their adherence. The interview will likely last about one hour and will be audio-recorded. The interview can be done at your office/workplace or another place where you feel comfortable.

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WHAT ARE THE RISKS?
There are no particular risks to participating in this study. However, you could become tired or fatigued. If this becomes the case, let the researcher know and the interview will be stopped. The interview can resume after a brief break or at another convenient time. You may choose not to resume the interview by telling the researcher.

WILL I BENEFIT IF I TAKE PART?
If you agree to participate in this study there will be no direct benefit to you. However, the information we get from this study may help us to provide better care in the future for patients with heart disease.

DO I HAVE TO PARTICIPATE?
You are under no obligation to participate in this study. Participating in this study is voluntary and you may withdraw from the study at any time. If you wish to withdraw from the study, you may do so by telling the researcher.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?
You will be paid an honorarium for study participation ($50) and any costs associated with study participation (e.g., parking) will be reimbursed.

WILL MY RECORDS BE KEPT PRIVATE?
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Dr. Kathryn King-Shier (403) 220-4643

Ethics ID: 24310

Study Title: What are the factors that influence South Asian people with coronary artery disease taking (or not) their cardiac medications?

PI: Dr. Kathryn King-Shier

Version Number/Date: 1/Nov 2011

Page: 2/3
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Version Number/Date: 1/Nov 2011
Page: 3/3
APPENDIX E: PHYSICIAN INTERVIEW CONSENT

UNIVERSITY OF CALGARY
FACULTY OF NURSING
Informed Consent Form (Physicians/Pharmacists)

PROJECT TITLE: What are the factors that influence South Asian people with coronary artery disease taking (or not) their cardiac medications?

INVESTIGATORS: Kathryn King-Shier, RN, PhD
Twyla Ens, RN, BSN
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WILL I BENEFIT IF I TAKE PART?
If you agree to participate in this study there will be no direct benefit to you. However, the information we get from this study may help us to provide better care in the future for patients with heart disease.

DO I HAVE TO PARTICIPATE?
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PI: Dr. Kathryn King-Shier
Version Number/Date: 1/Nov 2011
Page: 3/3
APPENDIX F: MORISKY MEDICATION ADHERENCE SCALE

<table>
<thead>
<tr>
<th>Question</th>
<th>Patient Answer</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>1. Do you sometimes forget to take your medicine?</td>
<td>Y=1, N=0</td>
<td></td>
</tr>
<tr>
<td>2. People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your medicine?</td>
<td>Y=1, N=0</td>
<td></td>
</tr>
<tr>
<td>3. Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?</td>
<td>Y=1, N=0</td>
<td></td>
</tr>
<tr>
<td>4. When you travel or leave home, do you sometimes forget to bring along your medicine?</td>
<td>Y=1, N=0</td>
<td></td>
</tr>
<tr>
<td>5. Did you take all your medicine yesterday?</td>
<td>Y=1, N=0</td>
<td></td>
</tr>
<tr>
<td>6. When you feel like your symptoms are under control, do you sometimes stop taking your medicine?</td>
<td>Y=1, N=0</td>
<td></td>
</tr>
<tr>
<td>7. Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?</td>
<td>Y=1, N=0</td>
<td></td>
</tr>
<tr>
<td>8. How often do you have difficulty remembering to take all your medicine?</td>
<td>A=0, B-E=1</td>
<td></td>
</tr>
<tr>
<td>___ A. Never/rarely</td>
<td></td>
<td></td>
</tr>
<tr>
<td>___ B. Once in a while</td>
<td></td>
<td></td>
</tr>
<tr>
<td>___ C. Sometimes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>___ D. Usually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>___ E. All the time</td>
<td></td>
<td></td>
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Y=yes
N=no

Total Score
APPENDIX G: INTERVIEW QUESTIONS

A. Demographic info
1. What country were you born in?
2. How long have you been in Canada?
3. What kind of work do you do?
4. What is your highest level of education?
5. Are you married? Do you have children?

B. Medication info
1. Tell me about what happened to your heart?
2. What medications do you take?
3. Can you tell me what the purpose of each medication is?
3a) Morisky questionnaire
4. What do you do when you forget to take a dose?
5. What do you think will happen if you forget to take one dose? For a week? If you stopped forever?
6. How many months/years have you been taking cardiac medications—ie for blood pressure, lipid lowering?
7. Do you forget to take your medications?
8. Do you use a pill-container?
9. Do you have your pills blister packed?
10. How often do you fill your prescriptions?
11. What store do you buy your medications from?
12. Why do you buy your medications from that store?
13. How much do you pay for medications each month?
14. Do you have insurance to pay for your medications? How much of the total cost of your medications do you pay out of pocket?
15. Do you share your medications with friends and family?
16. Do you know of friends that share medications with their family or friends?
17. Do you take vitamins and herbs?

C. Adverse effects
1. What changes to your body and mind have you noticed since taking your medications?
2. Do you think this is from your medications?
3. Have you told your doctor about these issues?

D. Healthcare
1. Do you have a family doctor?
2. How did you find a family doctor?
3. How often have you seen your family doctor these last 12 months?
4. Do you have a cardiologist?
5. When did you see your cardiologist last?
6. Do you know what your last blood pressure was? Lipid levels?
7. Does your family doctor change your blood pressure or lipid or diabetic medications? Cardiologist?
8. What procedures has your cardiologist sent you for?
9. How many times have you seen your cardiologist in the last year?