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QUALITY OF PRIMARY CARE FROM THE PATIENT
PERSPECTIVE IN SAUDI ARABIA: A MULTI-LEVEL STUDY

By

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B.S.N., George Mason University, 2003
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A Dissertation
Submitted to the Faculty of the
School of Public Health and Information Sciences of the
University of Louisville in Partial Fulfillment of the
Requirements for the Degree of

Doctor of Philosophy

Department of Health Management and Systems Sciences
University of Louisville
Louisville, Kentucky

May, 2014

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A Dissertation Approved on

March 31, 2014

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DEDICATION

This dissertation is dedicated to my loving parents, Awad and Salihah Alahmary who have surrounded me with their eternal love, support, and sincere prayers; to my loving wife Eman Alahmary who has encouraged me to pursue my dreams and has been supportive and patient throughout my doctoral studies; and to my wonderful daughters, Maiar and Ala who have given my life new meaning.

I thank you all from the bottom of my heart. I love you all.

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ABSTRACT

QUALITY OF PRIMARY CARE FROM THE PATIENT PERSPECTIVE IN SAUDI ARABIA: A MULTI-LEVEL STUDY

Khalid A. Alahmary

May 10, 2014

Objectives: To assess primary care performance for measures of patients' experience in Community-based Primary Care (CPC) and Employer-based Primary Care (EPC) systems in Saudi Arabia, to examine variations in performance across the two systems, and to explore factors at both the individual-level and the organizational-level that explain variations in primary care performance.

Design and Methods: This is an observational and cross-sectional study, using comparative design and survey research methods. The newly revised and re-translated Arabic version of the Primary Care Assessment Survey (PCAS) was used to measure patients' experience of primary care. PCAS operationalizes the IOM definition of primary care, which identified core domains of primary care as accessibility of care, continuity of care, comprehensiveness of care, coordination of care, interpersonal treatment, communication, and community orientation. A two-stage cluster, matched sampling was employed to select 16 primary care centers (eight CPC and eight EPC centers) in Riyadh, the capital and largest city (population > 5.5 million) in Saudi Arabia. A systematic random sampling was employed to collect primary survey data from 612 adult patients visiting the selected primary care centers.

Results: After adjusting for differences in the patient-mix and taking into account the multi-level structure of data by means of multi-level modeling, EPC performed

statistically significantly better than CPC in interpersonal care (Mean_{EPC} = 68.3, 95% CI [± 6.3] vs. Mean_{CPC} = 59.5, 95% CI [± 5.9], $p = 0.024$, Effect Size (d) = 0.36) and communication (Mean_{EPC} = 69.8, 95% CI [± 4.9] vs. Mean_{CPC} = 64.4, 95% CI [± 5.5], $p = 0.035$, $d = 0.22$), in addition to the total quality score (Total PCAS_{EPC} = 60.4, 95% CI [± 2.9] vs. Total PCAS_{CPC} = 56.1, 95% [± 3.3], $p = 0.009$, $d = 0.31$). CPC performed statistically significantly better than EPC in community orientation (Mean_{CPC} = 47.8, 95% [± 5.7] vs. Mean_{EPC} = 35.5, 95% [± 6.2], $p = 0.003$, $d = 0.50$) and accessibility of care (Mean_{CPC} = 67.4, 95% [± 5.7] vs. Mean_{EPC} = 63.5, 95% [± 4.5], $p = 0.025$, $d = 0.23$). There were no significant differences between CPC and EPC in coordination of care ($p = 0.098$), comprehensiveness of care ($p = 0.208$), and visit-based continuity of care ($p = 0.354$). Patient-level (compositional) variables explained a significant proportion ($R^2 = 0.14$) of the observed level-one (within-centers) variations in measures of patients' experience. Those variables include gender, self-perceived health status, and patient-reported co-morbidity. Female patients, reporting poor health, and reporting chronic conditions are each statistically significantly associated with lower ratings of patients' experience of care. Organizational-level (contextual) variables explained a significant proportion ($R^2 = 0.78$) of the observed level-two (between-centers) variations in measures of patients' experience. Those organizational variables include practice type and proportions of family physicians in a center. EPC centers and those centers with higher proportions of family physicians are each statistically significantly associated with better patients' experience. Finally, aspects of care that were statistically significantly associated with better patients' experience include knowing the name of the physician and being with the same physician for longer durations.

Conclusion: Enhancing continuity and quality of patient-physician relationships may improve the overall patients' experience of care. Healthcare systems in Saudi Arabia might embrace the Bio-Psycho-Social model to foster a culture of health and caring. Effective, community-oriented primary care systems have the potential to re-orient health systems' from a sole focus on sickness and disease, to include additional approaches for prevention and wellness at the societal level. Positive indicators of health, at both the individual and community levels, are needed to better align existing healthcare systems with this goal, mission and vision to improve population health.

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CHAPTER I

INTRODUCTION

Background to the Study

“An ounce of prevention is worth a pound of cure “, is the golden rule when it comes to health and wellness. Primary care contributes to health by its focus on prevention, early detection and treatment of diseases (Macinko, et al., 2009). Effective primary care is characterized by the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and the community” (Institute of Medicine, 1996). High performing primary care is essential for efficient, effective, and integrated healthcare systems (World Health Organization, 2008b). In recent years, international health policy makers have paid increased attention to the role of primary healthcare as a strategic policy approach to change healthcare systems’ orientation from disease-focused systems to person-, family-, and population-oriented systems. Such a paradigm shift has put primary healthcare at the forefront of international health policies. The recent report of the World Health Organization, “Primary healthcare: now more than ever”, is a case in point (World Health Organization, 2008b).

This international commitment to make primary care the cornerstone of healthcare systems has stemmed from the increased recognition of the mounting evidence linking primary healthcare to improved health outcomes (Kringos, et al., 2010; Lee, et al., 2007;

Starfield, et al., 2005), reduced health disparities (Shi, et al., 2002), and reduced healthcare costs (Kringos, et al., 2010; Starfield, et al., 2005).

This evidence is demonstrated by a major international comparative study of 18 industrialized countries, which shows that the stronger the country's primary care orientation, the better the health outcomes (Macinko, et al., 2003). Stronger primary care is associated with lower rates of all-cause mortality, lower rates of all-cause premature mortality, and lower rates of cause-specific premature mortality from a wide array of chronic diseases (Macinko, et al., 2003).

International as well as cross-national studies also demonstrate that primary care, as compared to specialty care, is associated with a more equitable distribution of health in populations (Starfield, et al., 2005). For example, the availability of primary care is associated with lower mortality rates in disadvantaged populations, attenuating the adverse effect of income inequality on mortality. In other words, effective primary care buffers (lessens) the impact of income inequality on health. This "buffering effect" of primary care has been documented in a longitudinal ecological study in the United States showing that an increase of one primary care doctor is associated with 14.4 fewer deaths per 100,000 population, and that the magnitude of this effect is higher for a low-income black population (39.7 fewer deaths per 100,000 population) than for a high-income white population (15.8 fewer death per 100,000 population) (Shi, et al., 2005b).

Health systems' orientation to primary care has proven to be a cost-effective strategy. An international comparison study showed that countries with stronger primary care systems have lower costs of care and better health outcomes (Starfield, et al., 2002). The cost saving benefit of primary care is explained by its role in providing better preventive care, promoting more appropriate use of health services, and reducing the

need and utilization of costly acute care services (e.g., lower hospitalization rates) (Starfield, et al., 2005).

Despite the international recognition of the importance of primary care and its core attributes, efforts to assess and improve the performance of primary care have lagged behind. Historically, primary care did not lend itself to performance measurement because of the lack of a well-established conceptual framework of primary care practice and a lack of measurement methods to assess its performance (Starfield, 1998). In addition, evidence-based practices and quality standards have been primarily focused on hospital and specialist care (Hogg, 2011). The quality of primary care, where most interactions between people and health services take place, has received much less attention (Jha, 2008). This has been partially attributed to the availability of well-developed measures of technical aspects of care in hospital settings compared to the less available measures of clinical and interpersonal aspects of care in ambulatory care settings (Hogg, 2011; Starfield, 2009).

Realizing this measure imbalance, concerned healthcare organizations and researchers have undertaken considerable efforts to define primary care and its unique features. Among those are the reports of the World Health Organization and the Institute of Medicine that defined and advanced a conceptual framework of primary care (Institute of Medicine, 1996; World Health Organization, 2008b).

In this regard and to guide international health policies, the World Health Organization in its 2008 report proposed a global blueprint for action to achieve universal access to a functional and effective primary care system. The global report advances the core attributes of primary care that characterize high quality primary care that contributes

to improved health outcomes. These include accessibility, longitudinality (continuity of care), comprehensiveness, coordination (integration), person/family-centeredness, and community orientation (World Health Organization, 2008b). These are also consistent with primary care features introduced by the Institute of Medicine (Institute of Medicine, 1996). A growing body of evidence has linked the attainment of core attributes of primary care to improved health outcomes (Kringos, et al., 2010; Starfield, et al., 2005; World Health Organization, 2008b). As a result, primary care core attributes have been recognized as well-established indicators for primary care quality and benchmark criteria for its performance and effectiveness (Kringos, et al., 2010; Safran, et al., 1994; Shi, et al., 2003; Sibthorpe, et al., 2007; Starfield, et al., 2005).

Saudi Arabia is one of the countries that has adopted and supported the WHO primary healthcare approach since the 1978 Alma-Ata Declaration, which highlighted the importance of primary healthcare as a key strategy to achieve health for all by the year 2000 (World Health Organization, et al., 1978). With considerable success, Saudi Arabia has been progressively expanding the primary care system to increase availability and accessibility of free comprehensive, preventive and curative health services to the entire population (Ministry of Health, 2010b). Primary care services are delivered through a national network of Community-based Primary Care (CPC) centers operated and managed by the Ministry of Health (MOH). CPC centers serve as the peoples' first contact with the healthcare system, serving the gatekeeping function for health services utilization, providing preventive and curative health services, and coordinating care with other levels of the healthcare system. These important functions make the public primary care the cornerstone of the Saudi healthcare system. However, little is known about the quality of primary care in Saudi Arabia, particularly from the patient perspective.

Quality of Primary Care

Quality measurement and improvement has become a central tenet and an important organizational strategy for healthcare systems. There are several reasons why it is important to improve quality of healthcare. These include enhancing the accountability of healthcare providers and managers, increasing efficient use of resources, identifying and minimizing medical errors, increasing the appropriateness and effectiveness of care, increasing the responsiveness and orientation to patients needs, and ultimately improving health outcomes (Campbell, et al., 2002).

Patient-centered care has recently gained increasing prominence within the landscape of healthcare reforms (Institute of Medicine, 2001a). A growing body of evidence has revealed the importance of patient-centered care in improving quality of care and health outcomes (Albers, et al., 2010; Anderson, 2002; Beck, et al., 2002; DiMatteo, 1998; Stewart, et al., 2000). Acknowledging the emerging evidence of its importance, patient-centered care has been recognized by leading healthcare institutions as a core component of healthcare quality (Institute of Medicine, 2001a).

Patient-centered care is defined as “Health care that establishes a partnership among practitioners, patients, and their families (when appropriate) to ensure that decisions respect patients’ wants, needs, and preferences and that patients have the education and support they need to make decisions and participate in their own care” (Institute of Medicine, 2001b).

At the primary care level, patient-centered care is particularly important. Primary care by its very nature is person-centered rather than disease-focused. Patients present to primary care with undifferentiated diagnoses. The quality of relationships between providers and patients and continuity of relationships are of paramount importance to the

quality of primary care, beyond the mere clinical aspects of healthcare quality. Any quality assessment at the primary care level that fails to consider patient-centeredness and experience is incomplete. Capturing those unique features of primary care is essential when evaluating the quality of care at this level.

Patient-centered care is an integral component of patient-reported quality of primary care. In this study, patient-reported quality of primary care is defined as:

“patients’ report of their actual experience with the full continuum of primary care as reflected by their experience with the core processes (*attributes*) of primary care, which begins with seeking and accessing primary care (*accessibility*) to the receiving of ongoing (*continuity*), comprehensive (*comprehensiveness*), and coordinated care (*coordination*) and interacting with primary care providers (*communication* and *interpersonal treatment*) to participating in promoting community-oriented primary care (*community orientation*)”

This definition was developed by the author, based on the conceptual framework of the study. Those core attributes have been shown to improve the effectiveness of primary care and improve health outcomes; therefore valid and reliable measures of these core attributes may be used as indicators for primary care quality (Kringos, et al., 2010; Sibthorpe, et al., 2007; Starfield, 1998; Starfield, et al., 2005).

Dimensions of patient-reported quality of primary care can be captured by measures of patient experience with care (Rodriguez, et al., 2009a; Safran, et al., 2006). Measures of patient experience with care are different from traditional measures of patient satisfaction of care. Patient satisfaction of care reflects the “subjective appraisal, by the individual, of the extent to which the care provided has met the individual’s expectations and preferences” (Brennan, 1995). Therefore, satisfaction surveys weigh heavily on

individual expectations and preferences, which can vary widely among individuals and populations, rendering it less useful in judging quality of care and informing the needed improvement (Cleary, et al., 1988; Gold, et al., 1995; Starfield, et al., 1998). On the other hand, measures of patient experience with care are designed to reflect the patients' use, participation, and interactions with healthcare providers and systems and not merely the reflection of patients' subjective preferences and expectations (Browne, et al., 2010).

Additionally, measures of patient experience with care have been found to be more robust and reliable than measures of patient satisfaction of care (Salisbury, et al., 2010). Results from measures of patient experience have been found to be highly associated with clinical indicators of quality, thus it can be used as a quality indicator in its own right (Jha, et al., 2008). Improving patient experience with care has been found to improve the overall quality of care and at the same time may reduce inequalities in quality of care for disadvantaged populations (Lyrtzopoulos, et al., 2012).

In summary, measures of patient experience with care are designed to capture aspects of healthcare processes and activities, thus it is more appropriately used as a process measure of quality of care (Starfield, 1998). On the other hand, a measure of patient satisfaction of care is more appropriately used as an outcome measure of quality (Donabedian, 2005). Therefore, a combination of patient experience and patient satisfaction measures can provide a more robust patient assessment of primary care quality.

The current study uses the Primary Care Assessment Survey (PCAS), an evidence-based, multidimensional measure of patient experience with care. PCAS measures primary care core attributes (processes) known to improve health outcomes (Safran, et

al., 1998) (see Appendix A). The survey constitutes six subscales that measure each of the six primary care attributes, which include accessibility, continuity, comprehensiveness, coordination, interpersonal treatment, and communication. The survey includes an additional subscale that measures community orientation as the seventh core attribute of primary care, which has been adopted from another questionnaire (Shi, et al., 2001). The survey produces a separate score for each quality domain as well as a total score of primary care quality. The survey also includes a separate composite scale of patient satisfaction with care, which is scored separately and was not included in calculating the total quality score derived from patient experience with the core attributes of primary care. Description of the PCAS and its psychometric properties and use is provided in the methodology section.

With the renewed interest in primary care, along with the significant progress made in defining and measuring the essential domains for high quality primary care, it is now time to support a long-term strategy to assure an effective and sustainable primary care system. A good starting point is to explore factors associated with the quality of primary care, elicited from patients' experience, at the local level of patient-provider interactions.

Saudi Arabia Healthcare System

Saudi Arabia healthcare system is a national healthcare system in which the government manages, finances, and provides most of the health services for the entire population. This is in accordance with Article 31 of the Saudi Basic Law of Governance that states that “the State shall be solicitous for promoting public health and shall provide health care to every citizen” (Saudi Basic Law of Governance - Article 31, 1992). Therefore, healthcare is seen by the Saudi people as a right rather than a privilege. Health services are provided free of charge to the Saudi citizens and public sector expatriates.

However, the Saudi healthcare system is not a single-payer system. The private sector is increasingly becoming involved in the financing and provision of health services.

The most recent estimates reveal that the Saudi government provides approximately 60% of health services, the private sector provides about 20%, and the remaining 20% is provided by other governmental agencies for their own employees and their families (Ministry of Health, 2010b). The MOH is the main governmental entity responsible for the financing, provision, and organization of health services in Saudi Arabia. MOH is entrusted with the provision of preventive, curative, and rehabilitative health services for a large segment of the population.

MOH mainly operates general public hospitals and Community-based Primary Care (CPC) centers across the country. In 2010, there were 249 public hospitals and 2,094 CPC centers (Ministry of Health, 2010a). In addition to the provision function, MOH oversees and regulates other health services providers, including private healthcare providers and other governmental healthcare providers.

Primary Care System in Saudi Arabia

In accordance with the WHO recommendations of the 1978 Alma-Ata declaration, Saudi Arabia has adopted the primary care approach as the main strategy in the effort to achieve health for all (Ministry of Health, 2010b). Ever since, the primary care system in Saudi Arabia has expanded in size in order to increase access to essential primary care services for the entire population. Today, primary care is considered the cornerstone of the Saudi healthcare system. It is the people's first entry point to the health system. Primary care is delivered through a national network of CPC centers that serves

individuals and population health needs in every geographical region around the country (Mufti, 2000).

Primary care system has been rapidly expanding by building and operating more primary care centers. In 2010, there were 2,094 CPC centers distributed across the country, which constitutes a 22.6% increase from the 1707 CPC centers in 1995 and a 9.9% increase from the 1,905 CPC centers in 2005 (Ministry of Economy and Planning, 1990, 2010; Ministry of Health, 2010a). This reflects a continuing national health strategy aimed towards expanding and strengthening the primary care system.

CPC centers have been the peoples' and communities' first contact for health services. Those include a wide array of preventive and curative health services such as age-appropriate immunizations, well-child health, women's health, management of communicable diseases, chronic diseases early detection and management, minor surgical procedures, dental care, health education, and community outreach health services (school and home health) (Ministry of Health, 2010b).

The first contact function of CPC centers is reflected by its high utilization rates. In 2010, total patient visits to CPC centers numbered 54.95 million visits. This accounts for approximately 83% of total visits to MOH primary care centers, outpatient centers, and hospitals (Ministry of Health, 2010a). The average number of annual visits for each CPC center totaled 26,243 visits or 103 visits per day per center.

CPC centers also serve the gate keeping function in order to manage health services utilization. This is done by implementing a referral system in which the individual would not be able to use secondary or tertiary health care without first going to a primary care physician who then, based on need, refers the individual to the appropriate secondary or tertiary healthcare provider. Exception is made in case of emergency.

Local health centers are distributed according to geographic area and population density. Additionally, local health centers are organized such that they only serve people in their catchment area, which is the local community. Ideally, every family or individual would have a health file kept in their local health center.

In addition to MOH health centers, primary care is also delivered by other governmental agencies (for example, the Ministry of Defense, the National Guard, the Ministry of Interior, etc.) to their respective employees and their families through a system of Employer-based Primary Care (EPC) centers. EPC centers are linked with secondary and tertiary health services provided by hospitals and outpatient clinics within each governmental healthcare system. Similar to the CPC systems, EPC centers provide preventive and curative health services and are considered the peoples' first contact and entry point to the healthcare system of their respective employer.

The National Guard Healthcare (NGH) system, which represents the EPC system in the current study, delivers primary, secondary, and tertiary healthcare services to National Guard employees and their dependents. NGH system serves a total population of 1,121,601 according to 2010 estimates (National Guard Health Affairs, 2010b). Primary healthcare services are delivered by 69 EPC centers and clinics throughout the Kingdom. These centers and clinics are distributed in three regions: Central Region, Western Region, and Eastern Region. Riyadh is located in the Central Region. There are 18 primary health centers and clinics in Riyadh. Many EPC centers are located in residential compounds to serve employees and their families in a community-based and family-oriented environment. Other health clinics are located inside military compounds and sites to provide healthcare to military personnel. In 2010, there were 2,046,517 patient visits to EPC centers throughout the Kingdom. Total patient visits to EPC centers in

Central Region were 1,155,194 in 2010 (National Guard Health Affairs, 2010a). There was no city-level data available for Riyadh at the time of this study.

Population Health Status in Saudi Arabia

Saudi Arabia has made remarkable progress in improving the health and well-being of its population over the past several years (Ministry of Health, 2010b; Mufti, 2000). In 2010, life expectancy at birth was 73.7 years (74.9 years for females and 72.6 years for males). This accounts for about 84% increase in life expectancy from the 1960's life expectancy of 40 years and about 5 % increase in life expectancy from the 1990's life expectancy of 70 years (Ministry of Health, 2010a). The population mortality rate has gradually decreased from 23 per 1000 population in 1960 to 5.1 per 1000 population in 1990 and to 3.9 per 1000 population in 2010. A similar decreasing trend is documented in infant mortality rate, which decreased from 170 per 1000 live births in 1960 to 21.4 per 1000 live births in 1990 to 16.9 per 1000 live births in 2010 (Ministry of Health, 2010a).

These improvements in population health status were realized not only as a result of improvement in levels of health services but also as an accumulative effect of the general improvement in social and economical conditions in the country (Ministry of Economy and Planning, 2010; Ministry of Health, 2010a). However, some successful health interventions merit mentioning. Maternal and child health programs have expanded over the years and are currently integrated into the primary care system. Women's healthcare provides women with prenatal and postnatal care as well as other women's healthcare needs. One of the performance indicators for maternal and child health is the percent of deliveries attended and delivered by skilled health personnel which reached 100% in Saudi Arabia for the year 2010 (WHO, 2011b).

Immunization coverage for a wide array of communicable diseases has reached high rates as a result of adopting the WHO Expanded Program of Immunization (EPI) (Ministry of Health, 2010a). Immunization coverage for tuberculosis, measles, poliomyelitis, and hepatitis B reached 98% in 2010. Programs of disease prevention and control along with improvements in living conditions, sanitation, and quality of food and drinking water have resulted in eliminating or greatly reducing common infectious and environmental diseases such as tuberculosis, measles, amoebic dysentery, shigellosis and hepatitis A (Ministry of Health, 2010a).

Despite these improvements in health and health services provisions, emerging health problems face the Saudi population and challenge the Saudi health system. As Saudi Arabia underwent the transition from a developing nation to a more developed nation, a paralleled change in major causes of ill-health and burden of disease has occurred. Consistent with the Epidemiological Transition Theory (Omran, 1971), degenerative and man-made diseases have displaced pandemics of infection as the primary causes of morbidity and mortality in Saudi Arabia (Ministry of Health, 2010a; WHO, 2009). Changes in the Saudi population demographics and life style choices have contributed to the rise of non-communicable diseases. Prevalent chronic conditions in Saudi Arabia include cardiovascular diseases (CVD, 17%), diabetes (16.7%), and asthma (13%) (Ministry of Health, 2010a, 2010b). Leading causes of death in Saudi Arabia are (CVD), which account for 42% of mortality, road traffic accidents, injuries, and poisoning, which account for 15% of mortality, cancers, which account for 9% of mortality, and diabetes, which accounts for 6% of mortality (WHO, 2011a).

This new trend of threats to the nation's health necessitates reorienting the health system towards prevention and early detection of illnesses. One important policy option

is to leverage the current primary care system to prevent, treat, and manage chronic diseases more efficiently and effectively. But in order for primary care to achieve its highest potential and deliver on its promise, there is an immediate need to establish a sustained system of performance evaluation and quality improvement in primary care. The present study is one effort in this direction.

Statement of the Problem

In Saudi Arabia, national health policy has placed a great emphasis on the expansion of primary care system as the key strategy to achieve health for all. As a result, the number of primary care centers has steadily increased in recent years in order to expand access to essential preventive and curative health services. By focusing on prevention and getting closer to the population in local communities, primary care may help align the healthcare system with the larger public health system in the Kingdom.

However, while increasing access to and availability of essential primary care services is important, focusing on access and availability while not paying as much attention to quality and effectiveness of primary care is problematic. Keeping in mind that increased access and availability of primary care does not necessarily translate into high quality of care.

Little is known about the quality of primary care in Saudi Arabia, particularly from the patient perspective. Patient experience with care is becoming a central component for evaluating healthcare quality. At the primary care level, patients' perspective on quality is particularly important. Primary care is inherently patient-centered rather than disease-focused. The whole-person approach to patient care, effective communication with the patient, the quality of patient-provider relationship, and the continuity of that relationship

are unique aspects of primary care. Capturing those unique features of primary care forms the basis for more complete assessment of primary care quality.

The available evidence from Saudi Arabia indicates problems of quality in primary care. Studies show that, despite increased access to public primary care in Saudi Arabia, there is a general perception of low quality of public primary care. The overall patient satisfaction with the public primary care system is relatively low (Al-Ahmadi, et al., 2005; Al-Sakkak, et al., 2008; Qatari, et al., 1999; Saeed, et al., 2001a). Reasons for patient dissatisfaction include long waiting times, inconvenient operating hours for primary care centers, and overcrowding (Al-Faris, et al., 1996; Al-Sakkak, et al., 2008; Mahfouz, et al., 2004; Qatari, et al., 1999). As a result, patients have reported bypassing primary care system in favor of using other health care providers. For instance, individuals have reported choosing to pay out of pocket to use private primary care services despite their eligibility to use the public health centers at no cost (Al-Ghanim, 2005).

To address healthcare quality problems in the Kingdom, a national accreditation system has been put in place to formulate and enforce quality standards in health care organizations including primary care centers (Ministry of Economy and Planning, 2010). This national effort may have the potential to improve the quality of primary care, at least from a clinical perspective and a top-down approach to healthcare quality.

Primary care is characterized by its multiple and unique dimensions of care, which include accessibility of care, continuity of care, comprehensiveness of care, coordination of care, interpersonal care, and patient, family and community orientation (Institute of Medicine, 1996; Starfield, 1998). Unfortunately, this multidimensional, patient-centered, and bottom-up approach to primary care quality assessment has gained little attention in

Saudi Arabia. The same can be said in other parts of the world (Murphy, et al., 2001; Safran, et al., 2006). While clinical (technical) quality of care is important, there is also a need to take a balanced approach to recognize the importance of patient-centered care and interpersonal quality of care. Any quality assessment at the primary care level that fails to consider relational and interpersonal aspects of care is incomplete.

Most studies that have evaluated primary care quality in Saudi Arabia, while signaling quality problems, were limited in scope and did not capture the breadth of comprehensive primary care. In recent years, comprehensive conceptual frameworks of primary care have been advanced (Institute of Medicine, 1996; World Health Organization, 2008b). This has helped design better performance measurement frameworks and quality assessment tools for primary care. Surveys of patient experience with primary care have emerged as valid and reliable measures operationalizing the comprehensive definition of primary care (Safran, et al., 1998). No studies were found that measure patient experience with primary care and that used a multidimensional approach to evaluate primary care quality from the patient perspective in Saudi Arabia. The current study is an attempt to fill this gap.

Significance of the Problem

As a result of national policy emphasizing the primary care system, the utilization rate of primary care has risen substantially over the years. There was an 8.3% increase in health center visits from 50.7 million visits in 2006 to 54.95 million visits in 2010 (Ministry of Health, 2010a). This increase in the utilization of primary care services is considered an indicator of success for the governmental efforts in this area. The increase of utilization was a result of the expanded access to primary care and increased public awareness about preventive health services. Those trends in access and utilization

indicate the greater role of primary care in the Saudi health system. However, in the meantime, it is important to realize that higher demands and increased workload on the primary care system present an additional challenge to its organizational capacity, which can limit its ability to provide a high quality of health services (Al-Ahmadi, et al., 2005). The available evidence speaks to this point. The following is a discussion of the quality problem in primary care in Saudi Arabia.

The primary care quality problem in Saudi Arabia may be categorized into two main dimensions, problems of access to care and problems of effectiveness of care. Effectiveness of care include both clinical and interpersonal aspect of care (Campbell, et al., 2000).

Despite expanded access and availability of primary care in Saudi Arabia, patients have reported difficulties in accessing the primary care system. Long waiting times and overcrowding of primary care centers were among the main reasons for patient dissatisfaction with primary care access (Al-Faris, et al., 1996; Al-Sakkak, et al., 2008; Mahfouz, et al., 2004; Qatari, et al., 1999). Although more than 60% of patients reported that primary care centers were their first contact with the healthcare system, 40% were dissatisfied with delays and difficulties with access to primary care (Ali, et al., 1993). One study that examined correlates of patient satisfaction with primary care found that lower patient satisfaction was associated with long travel distance to the primary care center (Saeed, et al., 2001b). Patients dissatisfied with the ease and convenience of primary care access are likely to seek alternative costly healthcare facilities (Al-Ghanim, 2005). This, in turn, may lead to fragmentation of care and failure to realize the cost saving benefits of primary care (Kringos, et al., 2010; Macinko, et al., 2011).

Underuse of primary care is likely paralleled by overuse of hospital and acute care. For example, people have reported bypassing the primary care system entirely to use emergency rooms at general hospitals (Khoja, et al., 1997; Kontopantelis, et al., 2010; Shah, et al., 1996). Studies from Saudi Arabia have shown that the majority of patients (60%) presenting to emergency rooms come with conditions that can be treated and managed at the primary care center (Rehmani, et al., 2007; Siddiqui, et al., 2002a, 2002b). As a result, many emergency rooms suffer from overcrowding (mostly patients with non-urgent problems) and consequently experience delays in treating patients with real emergency problems, which may result in serious health consequences (Rehmani, et al., 2007). Primary reasons for over-utilizing emergency rooms include limited access to primary care, convenience access to emergency rooms, emergency room as the only healthcare provider, and 24-hour access to emergency rooms (Institute of Medicine, 2007; Kontopantelis, et al., 2010; Krakau, et al., 1999).

Underutilizing primary care while overutilizing specialty and acute care can increase healthcare costs while not commensurately contributing to the health of population. On the other hand, providing effective primary care can improve population health and reduce healthcare costs (Starfield, et al., 2002; Starfield, et al., 2005).

From effectiveness of care perspective, studies that have evaluated the effectiveness of primary care in Saudi Arabia reported mixed evidence. A number of studies and reports have indicated that some primary care programs have been effective especially those aimed at preventing and controlling communicable diseases. Those programs include vaccination (Darwish, et al., 1993; Ministry of Health, 2010b) and control of infectious diseases (Ministry of Health, 2010b). In 2010, the expanded program of immunization (EPI) against targeted diseases has reached high coverage rates with a

corresponding drop in the incidence rate of some vaccination-targeted diseases. For example, the MMR coverage reached 98.2% in 2010 with a corresponding reduction of measles incidence from 3.41 per 100,000 in 2006 to 1.29 per 100,000 in 2010.

Immunization coverage against poliomyelitis increased from 93% in 2000 to 98% in 2010. This was paralleled with no cases recorded for poliomyelitis for the year 2010 (Ministry of Health, 2010a).

However, other studies showed that other aspects of primary care were not as effective, especially those requiring ongoing and coordinated care. There is evidence of misdiagnosis or mismanagement of major chronic diseases such as diabetes (Al-Khalidi, et al., 2002b), hypertension (Siddiqui, et al., 2001), asthma (Dashash, et al., 2003), and mental disorders (Al-Faris, et al., 1999). For example, one study evaluated the referral and feedback system for diabetic patients attending a primary care center in Abha city who also required a referral to an eye specialist. The study found that the referral rate ranged from 40-68% and the feedback rate ranged from 71-72%, both of which were below the national target (Al-Khalidi, et al., 2002b).

Several studies reported the rate of uncontrolled blood pressure for patients followed in primary care centers, which ranged from 28.8% to 60% (Al-Shammari, et al., 1996; Al-Tuwijri, et al., 2006; Siddiqui, et al., 2001). These findings are comparable with data reported in other international studies (Chobanian, et al., 2003; Chockalingam, et al., 1998; Konzem, et al., 2002). However, this evidence indicates that there remains room for improvement in managing hypertension in Saudi Arabia and elsewhere.

Although national guidelines for quality assurance in primary care have been established several years ago (Al-Mazrou, et al., 1993), several studies indicated low levels of adherence to evidence-based practices in primary care (Al-Ansary, et al., 2002;

Dashash, et al., 2003). One study evaluated the adherence of primary care physicians to the national guidelines of Asthma management in National Guard primary care centers in Jeddah. The study found that prescribing practices did not adhere to national guidelines for asthma management. For example, doses of asthma medications were not documented in 37.3% of cases (Dashash, et al., 2003).

Beside clinical effectiveness, other important indicators of primary care performance include interpersonal treatment, communication, and continuity of care (Starfield, 1998). In Saudi Arabia, several studies showed that patients were not satisfied with interpersonal treatment and communication with primary care providers (Al-Khaldi, et al., 2002a; Saeed, et al., 2001a). Reasons for their dissatisfaction include physicians not spending enough time with patients (Al-Faris, et al., 1994), physicians not listening attentively to patients' complaints (Saeed, et al., 2001a), providers speaking other languages than Arabic (Al-Khaldi, et al., 2002a; Qatari, et al., 1999), and cultural barriers due to large proportion of primary care physicians being non-Saudis (Mahfouz, et al., 2007; Mansour, et al., 1993).

One of the organizational measures that was put in place to improve continuity of care is having each primary care center serve a defined population in its catchment area and keeping a health file for each individual or family in the local community (Mufti, 2000). While this may have contributed to better access and increased utilization (Khoja, et al., 1997), there is evidence indicating low levels of continuity of care as reported by patients (Al-Sakkak, et al., 2008; Mansour, et al., 1996) as well as indicated by records review (Dashash, et al., 2003).

In summary, despite the increased role of primary care in the Saudi health system, the available evidence indicates wide variations in access and effectiveness of primary

care. Continuity of care and interpersonal aspects of care are important dimensions of primary care that are often overlooked. Suboptimal qualities of primary care can hinder the national efforts to expand access to a more functional and effective primary care system. Additionally, healthcare system efficiency and optimal use of the allocated resources are threatened by underperforming primary care and the associated fragmentation of care.

Purpose of the Study

The main goal of the present study is to assess primary care performance on measures of patients' experience of care in CPC and EPC systems in Saudi Arabia, using the Arabic-translated and adapted Primary Care Assessment Survey (PCAS). To achieve this goal, the study has three objectives: 1) to identify area of strengths and weaknesses in processes of primary care as reflected by measures of patients' experience of care in CPC and EPC systems, 2) to assess the extent of variation in measures of patients' experience across the two systems, and 3) to explore factors at both the individual-level and the organizational- level that explain variations in primary care performance.

Performance assessment is based on the Institute of Medicine (IOM) and World Health Organization (WHO) conceptual definitions of primary care, which identified core attributes of functional and effective primary care as accessibility, comprehensiveness of services, continuity of care, coordination of care (integration), interpersonal treatment, communication, and community orientation (Institute of Medicine, 1996; World Health Organization, 2008b). The theoretical model of the study is a combination of Donabedian structure, process, and outcome model for quality of care and Starfield Primary Care Quality model. The core attributes of primary care are used as the process indicators for

quality of primary care system. The attainment (achievement) of the core attributes (process of care) of primary care is the indicator of a high quality delivery system.

Identifying areas of strengths and deficiencies in primary care delivery systems to achieve the core attributes can provide policy-relevant information to guide the quality improvement efforts at the primary care level. The study aims to identify those areas of strengths and deficiencies and attempts to explore factors associated with differences in the attainment of primary care core attributes.

The present study is an effort to assess primary care quality in Saudi Arabia using a multidimensional and patient-centered approach, elicited from patients' experience with care in differing systems of primary care. In addition, the study contributes to the recognition and understanding of patient-centered care and interpersonal quality of care as important dimensions of primary care quality.

Furthermore, the study puts more emphasis on patient experience with care than patient satisfaction of care. From a measurement validity standpoint, measures of patient satisfaction (more value judgment and non-specific) were found to discriminate poorly between primary care practices or physicians, but measures of patient experiences (less value judgment) have been found to discriminate more effectively between different practices or between different physicians (Salisbury, et al., 2010). In other words, patient experience measures are able to explain more variation at the practice and doctor level than do patient satisfaction measures.

To the best of my knowledge, this is the first study to assess primary care quality in Saudi Arabia using the multidimensional approach to primary care, informed by patient experience, and based on the WHO and IOM core attributes of primary care. The study also provides an Arabic-translated, validated, and evidence-based measure of patient

experience with primary care that can be used in quality measurement and improvement efforts in Saudi Arabia and other Arabic-speaking countries.

Research Questions and Hypothesis

Question I-A:

Are there differences in patient reports of their experiences of primary care between the CPC and EPC centers?

Research Hypothesis I-A:

There are differences in average PCAS scores reported by patients visiting either the CPC or EPC centers.

Null Hypothesis; Alternative Hypothesis:

$$PCAS_{CPC} - PCAS_{EPC} = 0; \quad PCAS_{CPC} - PCAS_{EPC} \neq 0$$

Hypothesis testing used two-tailed t-test with a 0.05 significance level.

Question I-B:

Are there differences in demographics, socioeconomic characteristics, health status, and healthcare services utilization among patient populations served by the CPC and EPC systems?

Research Hypothesis I-B:

CPC centers serve more socially disadvantaged patients with poorer health status than do EPC centers.

Null Hypothesis:

There are no differences in patient characteristics between CPC and EPC.

Hypothesis testing used one-tailed chi-squared test with a 0.05 significance level.

Question II:

What are the factors, at both the patient-level and organizational-level that explain variations in measures of patients' experience of care across CPC and EPC centers?

Research Hypothesis II:

Both patient-level variables and organizational-level variables will explain the variability in PCAS total score across CPC and EPC centers.

Null Hypothesis; Alternative Hypothesis:

$$\beta_1 = \beta_2 \dots = \beta_k = 0; \quad \text{at least one } \beta \neq 0$$

Hypothesis testing used two-tailed t-test with a 0.05 significance level.

Research Variables (Figure 1.1)**Independent (Explanatory) Variables:**

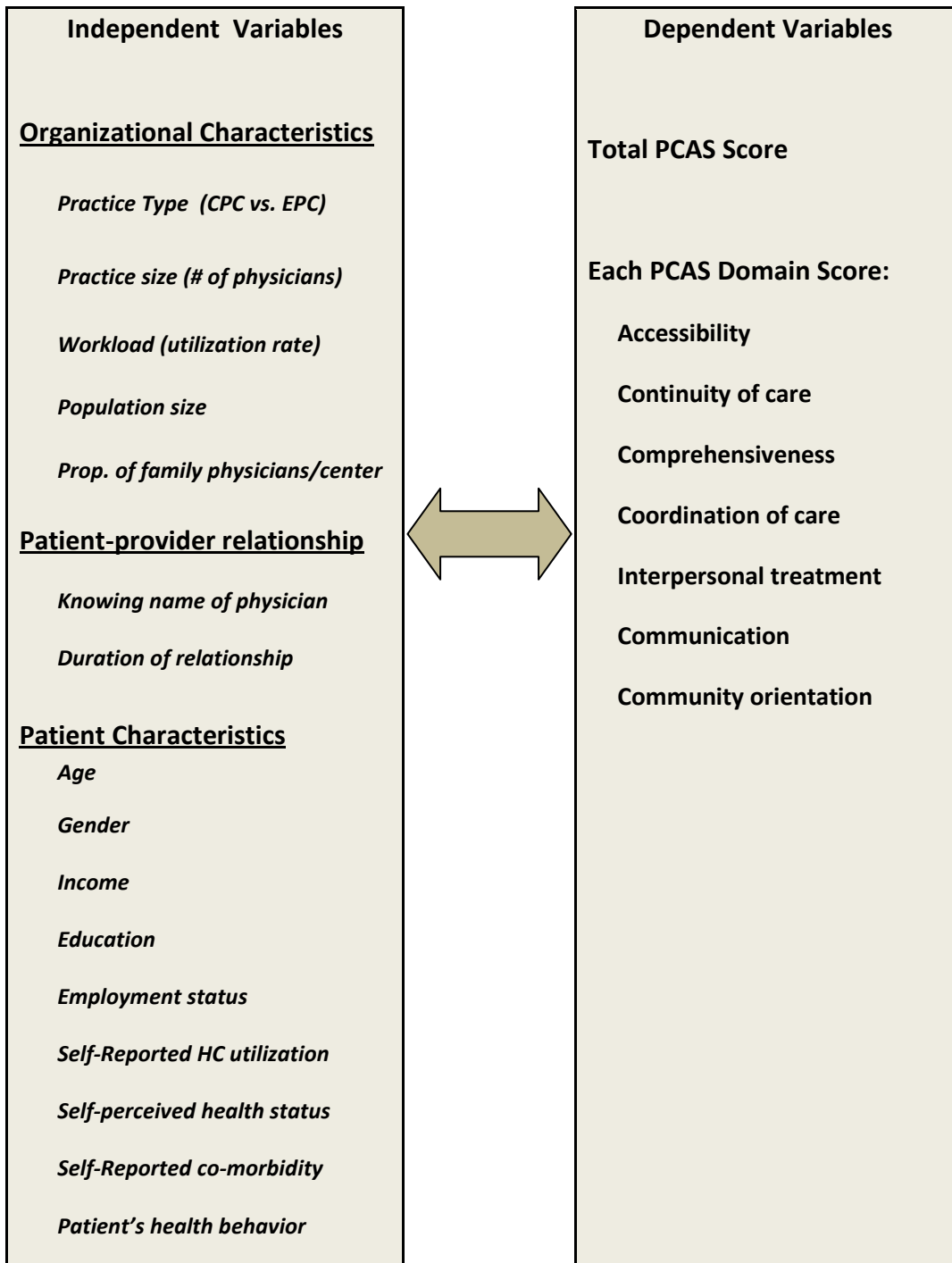
Independent variables in the study include organizational level and patient-level variables. Organizational-level variables include primary care type (CPC vs. EPC), the primary care center's workload (average patient visits per day), practice size (number of physicians), proportion of family physicians in the practice, and size of the population served by the primary care center. Patient-level variables include patient demographics, socioeconomic status (monthly income, education, and employment status), self-perceived health status, self-reported morbidity, patient's health behaviors, and patient-reported healthcare utilization. In addition, two independent variables measure the duration and quality of patient-provider relationship.

Dependent (Outcome) Variables:

The main outcome variable is the total score of Primary Care Assessment Survey (PCAS). Other outcome variables include each individual subscale score expressed by

means. Subscales include accessibility, continuity of care, comprehensiveness of care, coordination of care, interpersonal treatment, quality of communication, and community orientation.

Figure 1.1 Research Variables



Conceptual and Operational Definitions

Accessibility of care:

Accessibility of care in this study is defined as “the ease with which a person can obtain needed care, including advice and support, from the practitioner of choice within a time frame appropriate to the urgency of the problem” (Haggerty, et al., 2007). Accessibility includes convenience of geographical location, convenience of appointment system, waiting time, and extended office hours. Accessibility of care is measured using the accessibility scale. The accessibility scale contains six items that ask about the ease of getting an appointment, the convenience the center’s location, and the waiting time (Table 1.1).

Continuity of care:

Continuity of care in this study refers to the visit-based continuity, which is the extent to which the patient can see the same doctor in each visit (Safran, et al., 1998). Continuity of care is measured using the continuity scale, which contains two items (Table 1.1).

Comprehensiveness of care:

Comprehensiveness in this study is defined as “the provision, either directly or indirectly, of a full range of services to meet patients’ health care needs. This includes health promotion, prevention, diagnosis and treatment of common conditions, referral to other clinicians, management of chronic conditions, rehabilitation, palliative care and, in some models, social services” (Haggerty, et al., 2007). Comprehensiveness of care is measured using the comprehensiveness scale, which asks the patient if the primary care provider has discussed five preventive health behaviors based on the recommended preventive care for adults by the United States Preventive Services Task Force (USPSTF) (U.S.

Preventive Services Task Force, 2014). These include smoking, diet, exercise, stress, and seat belt use (Table 1.1).

Coordination of care:

Coordination of care describes the extent to which the primary care provider maintains linkage with other levels of care in order to facilitate transfer of care, coordinate care, and recognize the progress of care received in other levels of the healthcare system (Starfield, 1998). Coordination of care is measured using the coordination scale, which contains four items (Table 1.1).

Interpersonal treatment:

Interpersonal treatment refers to primary physicians' patience, friendliness, caring, respect and time spent with patient (Safran, et al., 1998). Interpersonal treatment is measured using the interpersonal scale, which contains five items (Table 1.1).

Communication:

Communication describes thoroughness of primary physicians' questions about symptoms, attention to what patient says, clarity of explanations and instructions, and advice and help in making decisions about care (Safran, et al., 1998). Communication is measured using the communication scale, which contains five items (Table 1.1).

Community orientation:

Community orientation is the extent to which primary care centers recognize the health needs of the community, become involved in community affairs, and involve community members in decision related to the structure of the practice and services provided, for example, by using advisory committees and community governance (Haggerty, et al.,

2007). Community orientation is measured using the community orientation scale, which contains three items (Table 1.1).

Patient experience:

The term patient experience is a relatively new concept used in healthcare. Patient experience reflects the use, participation, and interactions with components of healthcare systems and providers, and not merely the reflection of subjective preferences or expectations. In primary care, patient experience reflects the actual seeking and use of care and how the patient experiences the processes of the core domains of accessibility, comprehensiveness, continuity, coordination, communication, interpersonal treatment, and community orientation. (This definition was developed by the author based on the conceptual framework of the study).

Primary care:

Primary care is “the level of health service system that provides entry into the system for all new needs and problems, provides person-focused (not disease-oriented) care over time, provides care for all but very uncommon or unusual conditions, and coordinates care provided by other levels of the health service system” (Starfield, 1998).

Practice Type:

In this study, practice type refers to the organizational arrangement of primary care practice within the healthcare system. This includes whether the practice provides health services to the general public in the community (community-based) or to a subset of population affiliated with an employer healthcare system (employer-based).

Table 1.1
Item content of the PCAS

PCAS Sub-Scale	PCAS Item Content
Accessibility of Care	1- How many minutes does it usually take you to get to your primary care center? 2- How would you rate the hours that your primary care center is open for medical appointments? 3- When you are sick and call the primary care center for an appointment, how quickly do they usually see you? 4- How many minutes late do your appointments at your primary care center usually begin? 5- Ability to get through to the primary care center by phone? 6- Ability to speak to your doctor by phone when you have a question or need medical advice?
Continuity of Care	1- When you go for a routine check-up, how often do you see your regular doctor? 2- When you are sick and go to the doctor, how often do you see your regular doctor?
Comprehensiveness	Have your regular doctor discussed the following with you? - 1) Smoking, 2) Seat belt use, 3) Diet, 4) Exercise, 5) Stress.
Coordination	How would you rate the following? 1- Help your regular doctor gave you in deciding who to see for specialty care 2- Help your regular doctor gave you in getting an appointment with specialist 3- Regular Dr's communication with specialists or other doctors who saw you 4- Help your regular doctor gave you in understanding what the specialist or other doctor said about you
Interpersonal Treatment	How would you rate the following? 1- Amount of time doctor spends with you 2- Doctor's patience with your questions or worries 3- Doctor's friendliness and warmth toward you 4- Doctor's caring and concern for you 5- Doctor's respect for you

Table 1.1 Continued

<p>Communication</p>	<p>How would you rate the following?</p> <ul style="list-style-type: none"> 1- Thoroughness of doctor's questions about your symptoms and how you are feeling 2- Attention doctor gives to what you have to say 3- Doctor's explanations of your health problems or treatments that you need 4- Doctor's instructions about symptoms to report and when to seek further care 5- Doctor's advice and help in making decisions about your care
<p>Community Orientation</p>	<ul style="list-style-type: none"> 1- Does anyone at your primary care center ever make home visits? 2- Does your primary care provider know about the important health problems of your neighborhood? 3- Does your primary care provider get opinion and ideas from people that will help to provide better health care?

CHAPTER II

LITERATURE REVIEW

To discuss quality assessment in primary care, this chapter introduces the theoretical framework of the study and describes how primary care quality can be assessed based on the framework. Research studies pertinent to primary care quality assessment are reviewed. In light of the theoretical framework of the study, approaches to quality assessment and measurement in primary care are discussed and critiqued.

Theoretical Framework

“If we can’t measure it, we can’t improve it”

-W. Edward Deming

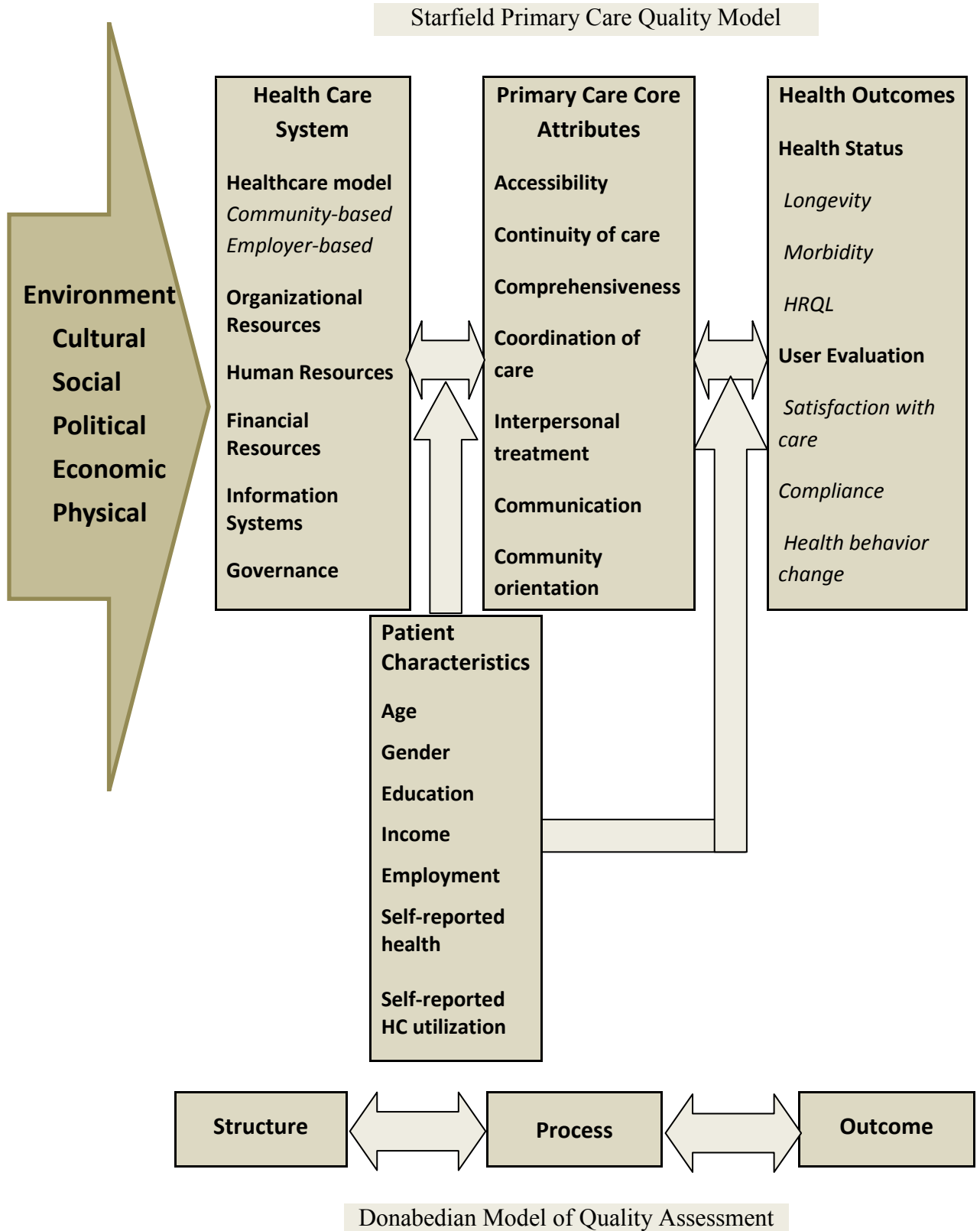
The assessment of quality must be derived from scientifically sound conceptual and operational definitions of the quality of care (Donabedian, 1966). Whilst there is no universally-accepted definition of “quality of care”, it is widely acknowledged as a multidimensional concept that may be defined according to (1) the scope (narrow vs. broad definition of health and responsibility for health), (2) the context (hospital care, ambulatory care, community-based care), (3) the focus (clinical vs. interpersonal aspects of care), and (4) the perspective (patient, provider, payer, government, and community) (Campbell, et al., 2000; Donabedian, 1988; Institute of Medicine, 2001a). Such

conceptual multiplicity suggests that defining quality of care is almost as elusive as measuring it. Nevertheless, concepts of quality and methods of quality measurements have evolved over the years and have become central to organizational development, change management, and performance improvements in societal organizations and systems.

For the purpose of this study, the definition of quality in the context of primary care from the perspective of patient with an emphasis on patient experience and interpersonal aspects of care will be explored. But first, a discussion of the theoretical background of quality in healthcare will be useful to lay the foundation for a scientifically sound conceptualization of primary care quality, which then, can be appropriately operationalized for the purposes of quality measurement and research and ultimately for quality improvement purposes.

The study uses a combination of two theoretical models to guide the conceptualization and operationalization of primary care quality assessment (Figure 2.1). The first is Donabedian model of quality assessment (Donabedian, 1980). The second is Starfield Primary Care Quality (PCQ) model which is an extension of Donabedian model with a focus on primary care (Starfield, 1998). A discussion of both models follows.

Figure 2.1 Conceptual Framework of the Study



Donabedian's Structure, Process, Outcome Model

Avedis Donabedian was the first to introduce quality assessment in healthcare systems. Donabedian's work led to the conceptualization of the classic structure, process, and outcome model of quality measurement (Donabedian, 1980). Donabedian model of quality of care has been widely used in healthcare quality measurement and improvements efforts. Today, it remains one of the most cited works in healthcare quality research (using the Web of Knowledge search engine, under the title: quality of care).

Donabedian, in his work on quality of care, has made the distinction between three approaches to quality measurement according to the nature and source of information (criterion) used to judge quality of care. Those criteria of quality (indicators) can be classified under three categories: structure, process of care, and outcome of care (Donabedian, 1966). Structure domain constitutes the attributes of the settings in which care is delivered (Donabedian, 1988). These encompass physical resources (facilities and equipments), human resources (number, type, and qualification of personnel), financial resources (methods of payments and reimbursements), and information resources (type and mechanisms of record keeping and processing). In primary care, the ratio of primary care physicians to population is one example of a structure measure of primary care quality. In the current study, the practice type, practice size, practice utilization, and the proportion of Family Physicians in the practice are used as characteristics of the structure domain.

Process of care denotes the activities by both patients and providers of care in receiving and giving health services. Process measures of quality in primary care capture all the activities that reflect the core attributes of primary care, which include

accessibility of care, continuity of care, comprehensiveness of care, coordination of care, communication, interpersonal treatment, and community orientation (Institute of Medicine, 1996; Starfield, 1998).

Outcome reflects the effect of care on the health of individuals and populations. In health services research literature, outcomes have been categorized using different ways such as negative vs. positive outcomes, objective vs. subjective outcomes, or clinical (technical) vs. interpersonal outcomes. Generally speaking, outcomes can belong to one of the (5 D's): Death (mortality), Disease burden (morbidity), Disability (loss of optimal functioning), Discomfort (uncontrolled pain), and Dissatisfaction (quality of life) (Lohr, et al., 1990). Using Donabedian dichotomy of outcomes (Donabedian, 1988), clinical outcomes would include death, disease, and disability attributed to health care. These are also referred to as negative outcomes and considered objective measures. On the other hand, interpersonal outcomes relate to levels of patient satisfaction with care and influences of care on quality of life as perceived by patients. These tend to emphasize positive outcomes and are considered subjective indicators for quality.

In summary, healthcare quality assessment can be conducted using structure or process or outcome measures of care. However, caution must be given when classifying quality approaches into these three categories. Such classification can evoke a wrongful mental image of separation between structure, process, and outcomes and that each one of them is independent from the other. The essence of Donabedian model is that elements of structure, processes of care, and outcomes are interdependent and interlinked. Furthermore, It is assumed that good structure promotes good processes of care and good process of care, in turn, promotes good outcomes (Donabedian, 1988). It is similarly

important when choosing an approach to assess quality that one should not make a judgment about quality based on the selected measure unless there is scientific evidence linking that measure to improved health outcomes. Thus, an important prerequisite to quality assessment in healthcare organizations is conducting research to examine linkages between structural attributes and processes of care conducive to better outcomes, bearing in mind that processes of care would not be considered conducive to positive outcomes without examining this linkage as well.

Utilizing Donabedian model of quality assessment, research studies in the area of quality can also be categorized into three main approaches: (1) studies that investigate linkage between the structure and the outcomes of care, (2) studies that investigate relationship between process of care and outcomes, and (3) studies that investigate the relationship between structural arrangements and processes of care that have been shown to improve individuals and population health outcomes.

Given that the evidence of linkages between structure and process of care or between process of care and outcomes has been established, there are considerations that merit special attention when choosing an approach for quality evaluation. Each one of the three approaches to quality assessment has its own strength and weaknesses. The decision to choose one or another depends on the purpose of quality assessment, the context of the assessment, and the available evidence upon which a valid judgment of quality can be made. The next section discusses the three approaches to quality assessment in the context of primary care.

Primary Care Quality Assessment

Historically, primary care did not lend itself to quality assessment and performance evaluation because of the lack of a well-established definition of primary care practice components as well as a lack of measurement methods to assess its performance (Starfield, 1998). In addition, evidence-based practices and quality standards have been primarily focused on hospital and specialist care. The quality of primary care, where most interactions between people and health services take place, has received much less attention (Jha, 2008). This has been partially attributed to the availability of well-developed measures of technical aspects of care in hospital settings compared to the less available measures of clinical and interpersonal aspects of care in ambulatory care settings (Hogg, 2011; Starfield, 2009).

Compared to hospital care, assessing the quality of primary care is rather a challenging task (Palmer, 1988). In the hospital setting, there is a definite episode of care, which begins with patient admission and ends with one of two major outcomes of care: the patient either dies or is discharged, and the discharge status is relatively easily described. In primary care, there is no clear episode of care with an entry and end points (Starfield, 1998). Patients present to primary care for a few-minutes and visit at sporadic intervals. The limited time of contact with patients make it difficult to monitor the progression of their conditions and assess how they respond to therapy in a timely fashion. What complicate the issue even further is that patients usually present to primary care with undifferentiated diagnoses and a wide array of health complaints. The indefinite nature of health problems do not lend itself to standard care practices and primary care physicians are primarily dependent on their best professional judgment to provide care to their patients.

These differences in primary care practice challenge the traditional disease-focused approaches to quality assessment and highlight the need for other approaches to quality assessment that match the holistic nature of primary care. Addressing this need, a major work in primary care quality assessment has been accomplished by Barbara Starfield who was a lifelong advocate and researcher of primary care in the United States and abroad (Starfield, 1998). The next section will discuss Starfield PCQ model.

Starfield Primary Care Quality Model

The PCQ model derives from the premise that the concept of quality of care is more than the assessment of disease-focused prevention and management of illnesses. This wider view of quality is particularly important in primary care, which is inherently person-focused and gives more value to interpersonal aspects of care and longitudinal relationships between patients and providers. The model describes four aspects in defining and evaluating primary care quality. These include (1) resource capacity (in the current study, also referred to as structure measures), (2) services delivery and (3) clinical performance (in the current study, also referred to as process measures), and (4) health status assessment (in the current study, also referred to as outcome measures) (Starfield, 1998). Following sections will discuss structure, process, and outcome approaches to quality assessment in primary care. In doing so, justifications for using the process of care approach to assess quality of primary care in the present study will be explained.

Structure Measures of Primary Care Quality

One approach to evaluate the quality of primary care is to assess the adequacy of its organizational, human, financial, and informational capacities that are needed to carry its functions (Starfield, 1998). For example, the number and type of appropriately trained

personnel to deliver primary care, the range of preventive, promotional, and curative care services provided, the organizational arrangement of primary care providers in the community, the mechanisms of governance to assure the availability and accessibility of primary care functions to meet population needs, the adequacy and type of financing for primary care services, and the availability of information systems capabilities for providing services and evaluating them.

Investigating the linkage between the structure and the outcomes of care can be rather challenging. Theoretically, one reason for this is the need to account for the mediating function of the process of care. For instance, certain arrangements in the structure might not directly influence changes in outcomes without, first, triggering changes in processes of care, which then, affect changes in the outcomes (Donabedian, 1988). Nevertheless, structural indicators can provide information about the adequacy of the infrastructure that enables the process of care to take place.

The way primary care practice is managed (centralized vs. decentralized) influences the performance of preventive care delivery. Similarly, the adequacy of clinical support system is positively associated with primary care performance. These findings have been shown in a study that examined the relationship between primary care practice characteristics and the performance of colorectal cancer (CRC) screening in 155 primary care clinics of the Veteran Affairs (VA) healthcare system (Yano, et al., 2007). The study found that primary care practices with high levels of local practice autonomy and adequate clinical support systems were more likely to provide CRC screening for their patients than those practices with less practice autonomy and resources. Furthermore, the size of the practice was negatively associated with the CRC screening performance. Practices with higher patients' volume provided fewer CRC screenings,

even after controlling for other patient and practice characteristics. This may be explained by the notion that physicians with smaller list size experience less workload and therefore have more time to spend with patients and discuss needed care. However, evidence is mixed regarding practice size and performance. Other studies showed positive effects of large practice size on the quality of care, especially when this association is mediated by stronger clinical support systems in larger practices (Battista, et al., 1990; Goldzweig, et al., 2004).

Organizational arrangements of primary care may influence the practice performance and patient experience with the core attributes of primary care. One study compared primary care quality provided to patients in community health centers (CHCs) with that provided to patients in health maintenance organizations (HMOs) in the U.S. (Shi, et al., 2003). In this study, primary care quality was measured using patient experience survey that operationalizes the IOM definition of primary care (Institute of Medicine, 1996).

The study found a significant association between organizational setting and performance on primary care attributes. More specifically, CHCs performed better than HMOs in primary care domains of continuity of care, comprehensiveness of care, coordination of care, community orientation, and overall primary care performance, after controlling for race, income, insurance, duration of use, and physician choice. These findings may be explained by the nature of HMOs that provide episodic and disease-focused care, compared to the longitudinal and whole-person approach in CHCs. The study found no significant difference in accessibility of care. Factors that were more

predictive of quality of primary care included longer duration with usual source of care, physician choice, ability to pay for healthcare.

However, those results should be interpreted in light of two important limitations. First, the study compared CHCs, which traditionally provided primary care with other providers in HMOs that may not primarily provide primary care service. This may have biased the results toward favoring CHCs over HMOs. Second, the study surveyed patients in only one CHC and one HMO plan, which limited the generalizability of the findings.

Other international studies, however, confirmed the relationship between different organization arrangements and quality of primary care in Brazil (Macinko, et al., 2007), South Korea (Sung, et al., 2010), Hong Kong (Wong, et al., 2010), and the U.S. (Safran, et al., 2002). In most cases, traditional primary care providers serve more disadvantaged populations and perform poorly, compared to private primary care providers.

One study compared the quality of primary care from the patient perspective in publicly-funded general outpatient clinics (GOPCs) with that in private general practitioners clinics (GPCs) in Hong Kong (Wong, et al., 2010). Both GOPCs and GPCs provide a wide array of primary care services. However, GOPCs services are heavily subsidized by the government, mostly community-based, and generally serve financially vulnerable, the elderly, and patients with chronic diseases. On the other hand, GPCs provide health services for the insured or on a fee-for-service basis.

The study found that GPCs performed better than GOPCs in accessibility domain, continuity of care domain, patient-centeredness domain, and community orientation domain, in addition to total quality of primary care as measured by patient experience.

Poorer performance of GOPCs may be explained by that fact that they largely serve socially disadvantaged population with poorer health. These characteristics may be associated with lower ratings of patient experience. This explanation was partially supported by the study. Most of the differences in performance were attenuated by adjusting for income, insurance, education level, age, gender, and the presence of chronic conditions. However, private providers still scored significantly higher in accessibility and continuity domains as well as the total quality. Faster and convenient access and better interpersonal treatment in private practices may explain the better quality reported by patients.

In addition to the influence of management and organization-level characteristics on primary care performance, policy-level characteristics also influence primary care system performance and outcomes. Governance mechanisms to ensure the availability and accessibility of primary care have been associated with stronger primary care system and better health outcomes. This finding has been shown in an international comparison study of 13 countries, which compared health outcomes between the more primary care-oriented countries (as measured by universal access to primary care, low cost sharing, comprehensive services, and family-oriented services) and the less-primary care oriented countries (Starfield, et al., 2002). The study found that highly primary care-oriented countries have better health outcomes (as measured by years of potential life lost, low birth-weight rates, and postneonatal mortality) even after controlling for income inequality and smoking rates. Governmental supportive policies of primary care were the most consistent policy characteristics present in countries with high primary care scores and absent in countries with low primary care scores.

In Saudi Arabia, there are several structural measures that have been put in place to strengthen primary care and support its functions. For example, primary care centers are organized in a way such that each center provides primary care to a defined population in its catchment area. Additionally, each individual or family in the catchment area would have a personal health file kept in the center. These measures aim to improve the continuity and coordination of care as well as promote community-oriented health services to meet health needs of a defined population. However, little is known about the extent to which those structural measures are related to the process of care and the attainment of the features of primary care, namely continuity of care, coordination of care, and community orientation. The present study attempts to answer these questions.

Finally, in order to make structural measures of quality relevant, evidence must be established that links structure with processes of care, which in turn, must be linked to improved health outcomes or proxies for health outcomes. The next section will discuss this aspect in greater details.

Process Measures of Primary Care Quality

There has been considerable debate about the relative merits of assessing processes versus assessing outcomes in healthcare quality assessment (Campbell, et al., 2000; Donabedian, 1988; Lohr, et al., 1988). However, both approaches have their own strengths and shortcomings and choosing one against the other is contingent upon the purpose and context of quality evaluation. For example, in quality improvement efforts, measuring and improving the process of care has been described as the primary object of quality assessment (Brook, et al., 1996; Brook, et al., 2000; Eddy, 1998). Process measures reflect the actual process of providing and receiving care. Measuring those

processes can provide readily available and actionable information about potential sources of deficiencies in care; therefore enable timely and targeted interventions to improve quality of care in the most efficient and effective way. But in order to yield positive improvements in health, process measures must not be used unless there is sound evidence linking those measures with improved health outcomes (Donabedian, 1988).

The process of primary care quality in Starfield PCQ model is assessed by evaluating primary care performance on the unique attributes of primary care, which include accessibility of care (first-contact care), continuity of care (longitudinality), comprehensiveness of care, coordination of care, communication, interpersonal treatment, and community orientation (Starfield, 1998). From this perspective, primary care system is evaluated by assessing the extent of attainment of the core attributes of primary care.

Process of primary care can be assessed using different perspectives of different stakeholders in the healthcare system. Traditional methods of process assessment have mainly focused on the professional perspective, primarily in the form of measuring the extent to which healthcare processes are conformed to evidence-based practices and guidelines. However, as social expectations and pressure on healthcare systems become more evident, patients' perspective, desires, and opinions are increasingly seen as having legitimate role in defining, assessing, and assuring quality of care.

In primary care, patient perspective of the process and quality of care is particularly important. Unlike hospital-based and specialty care, patients present to primary care with undifferentiated diagnoses and a wide array of health complaints. Patients very often seek primary care for routine and well visits and not necessarily for

treatment. Primary care inherently uses a holistic approach to patient care rather than disease-focused approach. Quality of relationship between providers and patients and continuity of that relationship is of paramount importance to the quality of primary care and may exceed the importance of technical aspects of quality. For example, one study showed that interpersonal and relational aspects of primary care were more highly correlated with preventive services delivery than were information technology capabilities in community-based primary care practices (Ferrante, et al., 2010b).

To assess the process of primary care from the patient perspective, there is a need for scientifically sound and evidence-based measures of patient experience with care. Realizing this need, measures of patient experience have become increasingly available and widely used in quality assessment and improvements efforts in the U.S. (Safran, et al., 2006), Europe (Danielsen, et al., 2010; Kontopantelis, et al., 2010), Canada ((Pineault, et al., 2011), and Asia ((Wong, et al., 2010) . Little is known about the use of patient experience measures in middle-eastern countries. One reason for that may be due to the lack of a measure of patient experience that is translated, validated, and adapted to the context of those countries.

Numerous studies have shown the scientific merit and measurement reliability of patient experience survey as an established measure of the process of care and valuable tool to inform quality improvement in healthcare (Browne, et al., 2010; Safran, et al., 1998; Salisbury, et al., 2010; Sequist, et al., 2008). Furthermore, the evidence shows that patient experience with care is a more appropriate measure of the process of care than patient satisfaction of care (Browne, et al., 2010; Danielsen, et al., 2010; Salisbury, et al., 2010). Conceptually, patient satisfaction is appropriately used as an outcome measure of quality (Donabedian, 1988; Starfield, 1998).

Patient experience with primary care has been used as the basis for assessing patient-reported quality of primary care (Lyrtatzopoulos, et al., 2012; Safran, et al., 2006). Patient reported quality of primary care is defined as “patients’ report of their actual experience with the full continuum of primary care as reflected by their experience with the core processes (*attributes*) of primary care, which begins with seeking and accessing primary care (*accessibility*) to the receiving of ongoing (*continuity*), comprehensive (*comprehensiveness*), and coordinated care (*coordination*) and interacting with primary care providers (*communication* and *interpersonal treatment*) to participating in promoting community-oriented primary care (*community orientation*).” Those core attributes (processes of care) have been shown to improve effectiveness and efficiency of primary care and improve health outcomes; therefore valid and reliable measures of core attributes may be used as indicators for primary care quality (Kringos, et al., 2010; Sibthorpe, et al., 2007; Starfield, 1998; Starfield, et al., 2005).

Evidence of the benefits of each attribute is important to support its inclusion as a key characteristic of primary care. The following sections consider these benefits.

Accessibility of Care:

Access to care is a fundamental characteristic of the health services system that enables people to utilize health services for the betterment of their health and wellbeing. Primary care serves as peoples’ point of entry to the healthcare system and the first level of healthcare to prevent diseases and treat and manage ongoing illnesses. The lack of an easy access to essential primary care may delay appropriate care and may lead to increased disease burden and the associated healthcare costs.

There are two types of accessibility: socio-organizational access and geographic access (Starfield, 1998). The former includes resources required to reach and obtain care, for example, having health insurance. Geographic access, on the other hand, involves characteristics related to distance and time required to reach and obtain health services, for example, the availability of nearby primary care provider.

The benefit of an easily accessible primary care is well documented. An ecological, longitudinal study examined the association between the supply of primary care physicians and population health outcomes in eleven states in the U.S. (Shi, et al., 2005b). The study found the supply of primary care physicians to be significantly related to lower mortality rates in both African American and white populations. This association remained significant even after controlling for the effect of income inequality and socioeconomic characteristics on mortality, suggesting that primary care is likely to be independently associated with lower population mortality. The study found that an increase of one primary care doctor per 10,000 population was associated with a reduction of 14.4 deaths per 100,000. The magnitude of the positive effect of primary care was higher for African Americans. The reduction in mortality rates was four times greater in the African American population than in the white majority population, indicating a positive role of primary care in reducing socioeconomic disparities in health. These findings were consistent with findings from other studies that indicated the association between primary care and population life expectancy and mortality (Macinko, et al., 2003; Shi, 1999; Shi, et al., 2002).

Another study examines the association between the availability of primary care physicians (PCPs) and individual health outcomes in Medicare beneficiaries (Chang, et al., 2011). The availability of PCPs was measured by estimating number of PCPs in

Primary Care Service Areas (PCSAs) using Medicare office claims data and matched that with Medicare beneficiaries based on the area zip code. Study outcomes included mortality, ambulatory care sensitive condition (ACSC) hospitalization, and Medicare program spending, adjusting for patient characteristics and geographical variables.

The unadjusted results showed that lower rates of ACSC hospitalizations per 1000 beneficiaries were associated with higher levels of PCPs per population. Also the study found that beneficiaries in areas with higher levels of PCPs per population had lower mortality and lower spending. However, adjusted results showed only small differences in mortality and Medicare spending but reduction in ACSC hospitalizations remained significant even after the adjustment of patient characteristics including age, sex, race, and level of illness. The study suggested that the positive benefits of primary care may not be the result of availability of PCPs per se. Instead, the association is much stronger with increased primary care activity in a particular area, indicating the importance of not only the availability of primary care providers but also the extent to which primary care functions are delivered.

Rates of hospitalization for conditions that should be prevented by exposure to good primary care, also referred to as ambulatory care sensitive conditions (ACSCs) were found to be negatively associated with the availability of primary care (Starfield, et al., 2005). For example, in the United States, geographic areas with more primary care providers have lower hospitalization rates for diabetes, hypertension, and pneumonia (Parchman, et al., 1994). This has also been the case in the United Kingdom. A study found that each 15 to 20 percent increase in general practitioners supply per 10,000 population was significantly associated with a reduction in hospital admission rates of about 14 per 100,000 for acute illnesses and about 11 per 100,000 for chronic illnesses,

even after controlling for socioeconomic characteristics and health status (Gulliford, 2002).

Continuity of Care

One of the unique characteristics of primary care is the patient-doctor relationship and the continuity of that relationship. Continuity of care is an important determinant of effective care especially for conditions that require regular contact with primary care providers including chronic diseases, mental health, and women and child health (World Health Organization, 2008b). Continuity of care (defined as the ongoing relationship between and the patient and his/her regular doctor) contributes to improved health outcomes mainly through its significant association with improved preventive care (Saultz, et al., 2005; Starfield, et al., 2005).

A study examined the relationship between having a usual source of care and the receipt of five preventive services, which includes influenza vaccine, Pap smear, mammogram, clinical breast exam, and prostate specific antigen (Blewett, et al., 2008). The study found that having a usual source of care was consistently associated with the receipt of recommended preventive care and screening services. This evidence was confirmed in other studies (Allen, et al., 2009; Ferrante, et al., 2010b).

In addition to the health benefits, continuity of care is also associated with lower healthcare costs. This has been shown to be the case in a study that analyzed data from a nationally representative sample of Medicare beneficiaries 65 years old or older to examine the relationship between continuity of patient-doctor relationship and processes of care and healthcare costs (Weiss, et al., 1996). The study found that patients who have

longer duration of relationship with their physicians have lower hospitalization and lower healthcare costs, after adjusting for key demographic and health characteristics.

Improved clinical outcomes have also been associated with better continuity of care. One study examined the relationship between continuity of care and diabetes control, as measured by glycated hemoglobin (HbA1c) (Mainous, et al., 2004). The study showed that better continuity of care is associated with better glycemic control for people with diabetes. The study did not find differences between having a regular doctor versus a regular site of care in terms of health outcomes.

Comprehensiveness of Care

As the entry point of the healthcare system, people, usually, present to primary care with new and less-defined health problems or complaints that may not relate to one particular organ system. Therefore, primary care physicians deal with a greater variety of presentations of illness than do specialists, who usually see patients in their later stages of illnesses with clearer diagnoses. Primary care physicians use the whole-person approach to address their patients' health needs while considering their family and social context. In this model of care, it is important to provide a full range of preventive and curative health services, and sometimes social services to meet patients' diverse health needs. In other words, comprehensiveness of care is an essential characteristic of primary care (Starfield, 1998).

The evidence of the benefits of comprehensiveness of care has been documented in many studies. One important benefit for comprehensiveness of care is the extent to which indicated preventive services are provided (Starfield, 1998). The receipt of a recommended preventive care service is considered a proxy measure of health outcomes

when there is strong evidence linking that service with improved health outcomes (U.S. Preventive Services Task Force, 2014). A population-based study examined the association of having a regular source of care that provided optimal primary care (comprehensive and ongoing) with the receipt of preventive care services among 3, 846 women in California (Bindman, et al., 1996). The study found that receiving optimal primary care from a regular source of care increases the likelihood of receiving recommended preventive care services, including blood pressure screening, clinical breast examinations, mammograms, and Pap smears.

Another important benefit of comprehensive primary care is the increased likelihood of addressing health problems that otherwise may go undiscovered in a more selective healthcare environment. One prime example is depression. One population-based study examined the association between comprehensiveness of primary care and the likelihood of care for depression among 1202 socioeconomically vulnerable women in Washington D.C. (O'Malley, et al., 2003) The study found that women whose primary care physicians provided more comprehensive care were more likely to be asked about and treated for depressive symptoms than women whose primary care physicians provided less comprehensive care.

Coordination of Care

Coordination of care is not only an important primary care characteristic, it is also essential for the attainment of other primary care functions. Without it, easy access to primary care would become more of an administrative task, ongoing care would not achieve its full potential, and comprehensiveness of care would become difficult to attain (Starfield, 1998). Primary care providers cannot ensure optimal and coordinated care

services for their populations without the support from specialized healthcare providers in their community (World Health Organization, 2008b).

Coordination describes the extent to which the primary care provider maintains linkage with other levels of care in order to facilitate transfer of care, coordinate care, and recognize the progress of care received in other levels of the healthcare system (Starfield, 1998). The WHO recent primary care report (World Health Organization, 2008b) stated that,

“where primary-care teams are in a position to take on this coordinator role, their work becomes more rewarding and attractive, while the overall effects on health are positive. Reliance on specialists and hospitalization is reduced by filtering out unnecessary uptake, whereas patient delay is reduced for those who do need referral care, the duration of their hospitalization is shortened, and post-hospitalization follow-up is improved.”

A randomized trial examined the effectiveness of a healthcare plan which uses primary care physicians as gatekeepers (coordinators) to control health services use and costs and compared that with another health plan with equal benefits but without the gatekeeper function (Martin, et al., 1989). The study found that the gatekeeper plan had 6 percent lower total cost per enrollee than the plan without a gatekeeper, after controlling for patients health status and socioeconomic characteristics.

Another study examined the impact of primary care case management on patterns of use of emergency rooms as a source of care for Medicaid enrollees. The intervention group with primary care case management was compared with equivalent samples from comparison groups in traditional Medicaid programs (Hurley, et al., 1989). Study findings indicated large reduction in the proportion of persons with at least one

emergency room visit. There was a reduction in ER use by 27 to 37 percent for children and 30 to 45 percent for Adults.

Interpersonal Treatment

Interactions between the patient and his/her physician create the basis of long-term relationship, which is essential for effective primary care (Starfield, 1998).

Interpersonal aspects of care, which include patience, friendliness, caring, respect and sufficient time spent with patient are of high value to patients and may exceed the importance of clinical aspects of care, especially in primary care (Ferrante, et al., 2010b).

High quality patient-doctor relationship has both clinical and economical benefits. One of the potential and immediate benefits of good doctor-patient relationship is the positive change in patient's behavior. Unhealthy behaviors such as smoking, physical inactivity, eating unhealthy food, and excessive alcohol drinking are modifiable risk factors for a wide array of chronic diseases that are the leading causes of death worldwide (World Health Organization, 2008a). When physicians gain their patients' trust, they can leverage this trust to influence positive change in patients' behaviors (Parekh, 2011). A study found that when a physician ask patients if they smoke and advise them to quit, their chance of actually quitting increase by 30% (Fiore, et al., 2008). Similarly, sustained patient-doctor relationship has been shown to improve the receipt of preventive care and improved patient adherence to medical advice (DiMatteo, 1994; Parchman, et al., 2004).

Building a good relationship with patients may also make a good business case for healthcare providers. For example, establishing good relationships with patients may lower malpractice rates for primary care physicians (PCPs) (Levinson, et al., 1997). The study showed that PCPs with no malpractice claims are those who listened carefully to

patients, encouraged them to ask questions and express concerns, and checked their understanding. No-claims PCPs spent more time with their patients than claims PCPs (mean length of the visit= 18 vs. 15 minutes, respectively).

Communication

Effective communication between the physician and the patient is essential to build a good relationship that contributes to better care experience, increased patient satisfaction, improved compliance, and improved health outcomes (Starfield, 1998). Effective communication entails thoroughness of primary physicians' questions about patient's symptoms, attention to what a patient says, clarity of explanations and instructions, and advice and help in making decisions about care (Safran, et al., 1998).

The benefit of effective patient-doctor communication is well documented. A systematic review examined the evidence linking the quality of physician-patient communication and patient health outcomes. The study found a significant association between effective patient-doctor communication and improved patient health outcomes. Significant improvements were found in emotional health, symptoms resolution, functional health, physiologic measures including blood pressure and blood sugar level, and pain control (Stewart, 1995).

A meta-analysis was conducted to estimate the magnitude of association between patient-physician communication and patient adherence to treatment plans. The study also examined the effect of physicians' training in communication skills on patient treatment adherence (Zolnierek, et al., 2009). The study found that effective patient-physician communication is significantly and positively associated with patient adherence. There was a 19% higher risk of nonadherence among patients who

experienced poor communication with their physicians than among patients who experienced effective communication with their physicians. The study also found that those physicians who received training in effective communication improved their patients' adherence significantly; the odds of patient adherence were 1.62 times higher than when a physician received no training.

Effective communication is not only the physicians' responsibility, ensuring patients' effective communication with their physicians is equally important. Teaching patients about how to communicate clearly with their physicians has been linked with improved patient adherence, satisfaction, self-control, and knowledge about their conditions (Post, et al., 2002).

Community Orientation

The role of primary care goes beyond providing optimal care for its user population to reach out to the community to address the community's health needs, recognize the socioeconomic context of health and disease, and engage community members in the process of improving health services delivery. It is this characteristic that has the potential to align primary care with public health functions to improve the health of the population. Community-oriented primary care has been defined as "the approach to primary care that uses epidemiological and clinical skills in a complementary fashion to tailor programs to meet the particular health needs of a defined population" (Starfield, 1998).

The benefits of community-oriented primary care have been documented. A population-based, longitudinal study investigated the effect of the expansion of community health centers (CHCs) in the U.S. on access and quality of primary care

(O'Malley, et al., 2005b). The study found that populations served by CHCs had better access, increased continuity of care, and improved preventive care as compared to other populations who receive care in other traditional healthcare settings. The study also provided an evidence of reduced disparities in health in populations served by CHCs as compared with other populations with no access to CHCs. This is consistent with findings from another study, which showed that people receiving care in community-oriented health centers receive more of the indicated preventive care services than does the general population (Agency for Healthcare Research and Quality, 2004).

Another population-based study compared indicators of access and health outcomes between rural patients receiving care from CHCs with rural patients receiving care from other types of facilities (Regan, et al., 2003). The study found that despite being sicker and poorer, rural patients who receive care in CHCs were more likely to receive the indicated preventive services (e.g., Pap smear) and less likely to have low-birth weight babies.

Summary

Substantial evidence has linked primary care core attributes to improved quality of primary care and improved health outcomes, and therefore making the case for using indicators of the core attributes as process measures of primary care quality. The review has also demonstrated the feasibility of measuring the core attributes to assess processes of primary care. The current study builds on this evidence to conduct quality assessment in primary care using indicators of core attributes as process measures of quality.

The next section will discuss the importance of assessing outcomes of care in quality assessment with special attention to outcomes that are more sensitive to primary care.

Outcome Measures of Primary Care Quality

Outcomes of care are the effects of care on the health status of patients and populations (Donabedian, 1988). Outcomes of care reflect the extent of recovery, restoration of function, and survival (Donabedian, 1966). “Health status” and “outcomes” have been used interchangeably to describe the effect of care on health. However, “health status” is generally used when the focus is on populations or subpopulations, while “outcome of care” is generally used to describe the effect of clinical care on individuals or group of patients (Starfield, 1998).

Outcome measures have been used as one of the three main approaches to quality assessment. Measuring outcomes of care is important to assess the ultimate effect of healthcare. However, there are some considerations that limit the use of outcomes as measures of health care quality (Donabedian, 2005). First, outcomes are results of multiple interactions of processes, activities, and conditions which occur not only within the healthcare system but also in the larger social context. Health outcomes are influenced, and sometimes determined, by social determinants of health, living conditions, population characteristics and behaviors, and other factors outside the control of the health services providers (Alder, 2008; Marmot, et al., 2006). So for quality assessment purposes, it may be imprecise to judge the quality of healthcare based on the result of interactions that occur outside the purview of health systems. A high degree of

adjustment for socioeconomic and demographic factors is needed if valid judgment about quality of care is to be made.

Second, in quality improvement purposes, it may prove difficult to disentangle casual pathways and trace sources in care processes that may have led to good or poor outcomes, which makes it even more difficult to guide improvement efforts to target potential sources of low performance in the process of care. Third, there is often a time lag (sometimes years) between the provision of health services and the manifestation of relevant outcomes, which limits the ability to make timely evaluation of the effect of healthcare. For these reasons, process measures of quality of care have been increasingly used as an alternative to outcome measures of quality. Process measures become most useful in quality measurement and improvement efforts because they enable timely monitoring of quality and generate actionable information that can be acted on immediately to correct any faulty process or further improve performance on important aspects of care.

Nevertheless, outcome indicators have been used to monitor health systems performance and assess the overall trend of health of the population. Mortality and morbidity rates have been traditionally used as the outcome indicators of the quality of healthcare. Historically, the availability of information about rates of disease and death and with less information about other aspects of health status led to the wide use of mortality and morbidity as the prime indicators of health status. For example, the International Classification of Diseases (ICD) supported international efforts to develop methods of coding causes of death to track trends of death and the occurrence of avoidable deaths (Starfield, 1998).

However, new ways of thinking about health and indicators of health status have broadened the traditional conceptualization of health from the merely biophysiological manifestation of disease to recognize the social and mental aspects of health and wellbeing. This is reflected in the WHO definition of health as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (WHO, 1948). A later WHO report further asserted that “health is a positive concept emphasizing social and personal resources, as well as physical capacities” (WHO, 1986). It has been recognized that negative indicators of health that focused on death and disease such as mortality and morbidity are no longer sufficient to capture the whole concept of health.

This broader conceptualization of health has led to the development of newer measures of health status that have an emphasis on people’s ability to perform their daily activities, and more recently on the positive themes of happiness, social and emotional well-being, and quality of life. These new methods are particularly relevant to the assessment of outcomes of primary care. Mortality measures may be distal results and may not reflect the effects of primary care. Similarly, morbidity measures may be less relevant to primary care because of the less differentiated diagnoses in primary care patients. Measures of functional status and health-related quality of life (HRQL) focus on the whole person rather than specific disease, and therefore are relevant to primary care. Other relevant measures of outcome of care from the patient perspective may include the increase of patient knowledge about his or her health, positive changes in patient’s health behavior, and the degree of patient satisfaction with care (Donabedian, 1988).

Patients’ views, opinions, and expectations about the care they receive have been increasingly incorporated into quality assessment. Patient satisfaction of care has been the

most common measure used to assess quality from the patient perspective. It is generally used as an outcome measure of quality of care (Donabedian, 1988). However, the determinants of patient satisfaction are less well understood (Cleary, et al., 1988). Also, there has been mixed evidence about the relationship between patient satisfaction and quality of care and about which aspects of care influence patient satisfaction (Cleary, et al., 1988). Nevertheless, patient satisfaction can predict patients' compliance with treatment (Kincey, et al., 1975), return for care from the same provider (Roghamm, et al., 1979) or change their provider (Marquis, et al., 1983), and may also predict resolution of symptoms and improvement in health status (Fitzpatrick, et al., 1987; Fitzpatrick, et al., 1983).

While patient satisfaction as a measure of quality can shed light on some aspects of health services quality, it may not provide adequate information about elements of the activities and processes of the delivery of care. Measures of patient satisfaction may not explain the actual experience of care that led to being satisfied or dissatisfied in the first place. Furthermore, satisfaction ratings are more subjective and weigh heavily on individual expectations and preferences, which can vary widely among individuals and populations, rendering it less useful in judging quality of care and informing the needed improvement (Cleary, et al., 1988; Gold, et al., 1995; Starfield, et al., 1998). While we cannot totally neglect patient satisfaction of care, it may be a better practice to use it as an outcome measure of quality in conjunction with the use of patient experience measure, which may provide more accurate assessment of the process of care and may explain probable sources of patient satisfaction or dissatisfaction with care (Salisbury, et al., 2010).

One of primary care unique features is its focus on prevention and health promotion. This needs to be taken into consideration when attempting to measure primary care quality. As discussed earlier, usually there is a time lag between preventive interventions and the expected outcomes; sometimes it takes years or decades, rendering it impossible to evaluate performance based on those foreseeable outcomes. In other cases, quantifying and measuring outcomes of prevention is not feasible, for example, estimating number of diseases prevented.

For these reasons, another approach to assess primary care performance, at least in the area of prevention, is needed. An alternative method is to assess the provision (process measure) of preventive services and compare it to standard preventive guidelines such as the US Preventive Services Task Force guidelines (U.S. Preventive Services Task Force, 2014). When there is sufficient evidence linking a preventive service with positive health outcomes, providing such as service can be used as a proxy measure for the outcome (Starfield, 1998). One example of a process measure that can be used as a proxy measure for outcomes is the rate of age-appropriate immunization in the population.

Numerous studies have assessed the quality of primary care using outcomes measures that are more sensitive to primary care. Substantial evidence has linked good primary care with the receipt of indicated preventive services (Allen, et al., 2009; Bindman, et al., 1996; Blewett, et al., 2008; Ferrante, et al., 2010a; Pandhi, et al., 2012). More specifically, having a usual source of care, continuity of care, comprehensiveness of care, and patient-centered care were the strongest predictors for receiving the appropriate preventive services, which included Influenza vaccination, cancer screening,

cholesterol screening, blood pressure screening, clinical breast exam, mammograms, and Pap smear.

The positive change in patient's health behavior is recognized as an important outcome of care (Starfield, 1998). A prospective cohort study examined the relationship between patient-centered primary care and patient's adherence behavior among hypertensive patients. The study also examined whether patient-centered care can predict blood pressure control (Roumie, et al., 2011). The study found a significant association between patient-centered primary care, particularly provider's communication skills, and patient antihypertensive medication adherence behavior. There was a gradient effect such that patients reporting the lowest patient-centered care score had the lowest adherence score and adherence increased as caring levels increased. The findings also confirmed a relationship between adherence behavior and blood pressure control; the greater the adherence, the better the control. However, the study was unable to demonstrate a direct relationship between patient-centered primary care and blood pressure control.

A randomized control trial examined whether patient activation (engaging patients to actively manage their own health) is changeable and whether changes in activation predict changes in actual health behaviors (Hibbard, et al., 2007). The study randomly assigned patients to an intervention group (Chronic Disease Self-Management Program which utilizes patient-centered care approach) and a control group (no intervention). Survey data were collected from both groups at baseline, 6 weeks, and 6 months. The study found that patient activation levels (believes in the importance of taking an active role in own health, increased confidence and knowledge to take action, taking action, and staying the course) have increased over time for the intervention group

at the initial phase but at 6 months-period, both intervention and control groups demonstrated an increase in patient activation. Additionally, the study did find that patient activation predicts positive changes in both generic self-management behaviors (engage in a regular exercise, follow a low fat diet, and manage stress in a health way) and disease-specific self-management behaviors (adherence to diabetic medications, regularly check blood sugar levels, and exercise regularly to manage arthritis). The study suggested that patient activation is an important intermediate outcome that should be monitored regularly by healthcare and public health providers. The study also demonstrated the feasibility of assessing changes in patient's health behavior as an outcome measure of quality which has the potential to inform quality improvement efforts to achieve better health outcomes.

Summary

Measuring health outcomes in primary care is an important approach to assess the quality of primary care. However, there are some considerations that need to be taken into account when using this approach. Primary care is inherently person-focused and places great emphasis on positive aspects of health. Negative indicators of health such as mortality and morbidity may be less relevant to primary care because of the nature and complexity of primary care and less-dependent on disease-focused model of healthcare. Outcome measures that are more sensitive to primary care are needed. Promising alternatives include patient-centered measures that capture people's ability to perform their daily activities, positive themes of happiness, social and emotional well-being, quality of life, satisfaction with care, increased knowledge and confidence, positive changes in health behaviors, and resolution of symptoms.

CHAPTER III

METHODOLOGY

Study Design

This study employed a comparative design using a cross-sectional, survey research approach. The study used a two-stage cluster, matched sampling to collect data from a random sample of 612 adult patients (using systematic random sampling) visiting sixteen primary care centers in two different types of primary care systems (CPC and EPC) in Riyadh City in Saudi Arabia. This sampling method is discussed in a later section. Data was collected using the Arabic-translated and adapted version of the Primary Care Assessment Survey (PCAS) (Safran, et al., 1998).

Study Sample and Setting

The study sample was comprised of patients aged 18 years or older visiting their primary care centers in two different types of primary healthcare systems in Riyadh, Saudi Arabia. The two systems are the CPC and the EPC. Comparing two different primary care models on the basis of the quality of care delivered to patients can help examine variations in quality across different systems and explore probable sources of the variation in core attributes of primary care. From a policy perspective, it is important to

identify and target leverage points that have the potential for a greater impact on primary care system performance. This study can provide evidence to guide policy interventions and to identify target areas that need attention.

CPC centers are the main delivery system of primary health care in Saudi Arabia and are operated and managed by the Ministry of Health (MOH). MOH is the main government entity responsible for the financing, provision, and organization of health services in Saudi Arabia. MOH is responsible for the provision of preventive, curative, and rehabilitative health services for a large segment of the population. CPC centers are distributed all over the country and are situated in the community to provide a wide array of primary and secondary preventive services to the public free of charge. CPC centers are distributed according to the geographic area and population density. CPC centers are organized such that they only serve people in their catchment area that is the local community. Ideally, every family or individual would have a health file kept in the local CPC center. Thus, CPC centers are considered an essential part of the Saudi public healthcare system. In addition to the disease prevention and treatment functions, CPC centers serve as a gatekeeping system to manage health services utilization and to coordinate care with other levels of the health system. CPC centers are the public's first contact and entry point to the health system.

EPC centers, on the other hand, are health centers that operate under the management of the National Guard Healthcare (NGH) system. EPC centers provide similar type of health services provided by the CPC centers. EPC centers provide preventive and curative health services to their respective agency's employees and their families free of charge. EPC centers are also considered as the individuals and families' first contact and entry point into the NGH system.

Sampling Plan

A two-stage cluster, matched sampling was employed in the study. This sampling method involves identifying distinct, naturally occurring social groups or clusters, such as schools or health centers. The first stage involves selecting a sample from the first cluster and then matching it with a sample from the second cluster based on a certain characteristic (for example, geographical location). The second stage involves selecting a random sample of members in each cluster; hence the name two-stage cluster, matched sampling.

In the current study, matching each EPC center with a nearby CPC center may help to obtain comparable sample of patients in terms of their social, economical, and environmental conditions. This can help to control, by design, for potential confounding factors such as patients' demographic characteristics, socioeconomic status, or other extraneous factors.

The researcher obtained access to the general administration's directory of primary care centers in each healthcare system which contains lists of all centers in Riyadh city. There were two inclusion criteria for primary care centers to be included in the study, 1) the center must have provided primary care services for at least one year and 2) the center must provide care to individuals and families. The second criterion excluded health centers that provide care to soldiers only in the EPC system. As a result, eight EPC centers met these inclusion criteria and were included in the study. Next, each EPC center was matched to the nearest CPC center. This was a center-to-center matching by geographical location. The MOH's geographical map for health centers was used to locate the nearest CPC center to the pre-identified EPC center. This process continued

until eight matched pairs of centers was selected, for a total sample of sixteen primary care centers.

Once a primary care center was selected, the second sampling stage involved randomly selecting adult patients visiting their primary care center to be surveyed. A systematic random sampling was employed to recruit potential subjects from all adult patients visiting the primary care center. This sampling technique was used to ensure randomness of the sample and to improve the representativeness of the target population. In this technique, participants were selected according to a predetermined interval. For example, every 5th patient visiting the center was selected. The interval was calculated by determining the average number of patients visiting the center per day and dividing that number by the required number of participants for the day. For example, if the average number of patients visiting the center is 50 patients per day, and the required number of participants for a day is 10, then the interval is 5. So every 5th patient was selected to complete the survey.

Power Analysis

The sample size was estimated by two methods. The first method used a power analysis. The second method considered the sample sizes used or recommended by previous observational studies with comparative design.

Power analysis can be used to estimate the minimum sample size required to detect a true difference (effect size, ES) in the outcome of interest with a given alpha level (α) (Cohen, 1988). From this definition, we know that sample size can be estimated by three parameters: the study power, the effect size, and the alpha level.

Cohen d effect size is defined as the difference between two means divided by the pooled

standard deviation of the data (Cohen, 1988). Cohen interpreted effect size d of 0.2, 0.5, and 0.8 as small, medium, and large, respectively (Cohen, 1988).

Previous studies that used PCAS instrument reported small to medium effect size Cohen d , which ranged from 0.32 to 0.40 (Safran, et al., 2000; Safran, et al., 1994; Safran, et al., 2002). In the current study, a conservative estimate of effect size was used, or Cohen d of 0.23. There are useful computer software programs that utilize the Cohen power table to estimate the sample size (Cohen, 1988) such as G-power (Faul, et al., 2009). Using the G-power 3.1 software program (Faul, et al., 2009), the sample size required was estimated, given alpha level (probability of type I error) of 0.05, d effect size of 0.23, power of 0.80, to be 298 patients per group or total sample size of 596 patients.

Additionally, previous studies from the UK and the United States indicate that a sample of at least 22 to 40 patients per practice is needed to provide a reliable estimate of performance on patient experience measures (Campbell, et al., 2008; Lyratzopoulos, et al., 2011; Safran, et al., 2006). Accordingly, the current study aimed to recruit 38-40 patients per health center to compensate for the possibility of uncompleted surveys.

The total sample size of the present study was 612 patients from all the sixteen primary care centers. Sixteen questionnaires were missing more than 50% of items and therefore were excluded. Final analytical sample included 596 valid questionnaires. The total number of recruitment attempts was 705. The number of subjects who refused to participate in the study after meeting the inclusion criteria was 93. Therefore, the refusal rate was 13% and the response rate was 87%. After taking into account the excluded questionnaires due to incompleteness, the final response rate becomes 84.5%. This is considered a very good response rate by the standard of survey research (Hogg, et al.,

2010), and is comparable to other studies using waiting area patient surveys (Dahrouge, et al., 2009).

Non-response can introduce non-response bias when non-respondents differ systematically from respondents (Elliott, et al., 2005). To assess for non-response bias in the current study, a sub-analysis compared the characteristics of those who completed the survey with those who did not complete the survey. Results showed no significant differences in age and gender between the two groups, which may indicate that there was no bias due to non-response.

Additionally, the evidence from previous patient experience studies indicated that there were no significant differences in reported experience between respondents and non-respondents (Danielsen, et al., 2010; Elliott, et al., 2009; Johnson, et al., 2010). Furthermore, the evidence showed that by adjusting appropriately for differences in the case-mix, much of the impact of non-response bias has been eliminated (Elliott, et al., 2009; Johnson, et al., 2010). The above mentioned studies also found that the adjustment for non-response bias does not improve the precision of performance comparisons among different practice settings. Finally, the present study attempted to reduce the impact of potential non-response bias by measuring and adjusting for differences in patients' case-mix between CPC centers and EPC centers.

Study Instrument

Background of the Instrument

The study used the Primary Care Assessment Survey (PCAS) (Safran, et al., 1998), after undergoing the process of translation to Arabic and the adaptation to the Saudi Context (see Appendix B). PCAS is a validated, patient-completed questionnaire

that operationalizes the Institute of Medicine definition of primary care. IOM defined primary care as “the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and the community” (Institute of Medicine, 1996). These core attributes of primary care parallel those endorsed by the World Health Organization (World Health Organization, 2008b).

The PCAS measures areas that the patients are the best source of information as reflected by their experience with care. Furthermore, the PCAS does not ask patients to judge technical aspects of quality which are beyond patients’ knowledge and expertise. Additionally, the PCAS is not a visit-specific measure. The PCAS measures primary care domains in the context of the clinician-patient relationship. The strength of the PCAS comes from its ability to measure primary care performance using a multidimensional approach that reflects the breadth of primary care practice.

The survey focuses on the interpersonal aspects of care in terms of how well the provider knows the patient health history, the effectiveness of communication, and interpersonal treatment. The survey also measures aspects of wellness and prevention by assessing whether the provider has discussed exemplary issues like smoking, diet, exercise, stress and seat belt use. These topics correspond to the United States Preventive Services Task Force recommendations for preventive care for adults (U.S. Preventive Services Task Force, 2014). Given the difficulty of measuring and quantifying preventive care provided, assessing the extent to which the provider discusses these topics with patient can be used as a proxy measure for the comprehensiveness of care (Starfield, 1998). In addition to measuring patient experience with primary care, a separate

composite measure of the overall satisfaction with care is included to add an additional dimension to quality assessment of primary care. However, it is not included in the calculation of the total score of patient experience (PCAS).

In addition to measuring the core attributes of primary care, the PCAS also measures those factors that can influence patient experience such as patient demographic and socioeconomic characteristics, health care utilization, reported-health behaviors, and reported-health status. It is important to measure and adjust for those potential confounders to improve the validity and reliability of primary care performance measurement.

Additionally, the survey has been rated at a fifth grade reading level (Safran, et al., 1998) on the Flesch-Kincaid reading ease index (Flesch, 1951; Kincaid JP, 1975).

PCAS Domains and Scales

In this study, the PCAS measures six domains of primary care quality. The domains are: accessibility of care (organizational access scale), continuity of care (continuity scale), comprehensiveness of care (comprehensiveness scale), coordination of care (coordination scale), communication (communication scale), and interpersonal treatment (interpersonal treatment scale). Community orientation domain was measured using a composite subscale of community orientation adapted from another valid and reliable instrument (Shi, et al., 2001). This additional subscale has undergone forward and backward translation from English to Arabic and has been reviewed by an Arabic-speaking committee of experts for its appropriateness to the Saudi context. Further details are provided in the Translation and Adaptation section below.

The PCAS scales range from 0 to 100 points, with higher scores indicating more of the underlying attribute, for example, more continuity or more accessibility. The survey uses a combination of response formats such as 5-point Likert scale, multiple-choice, and yes/no items.

Psychometric Properties of the PCAS

The PCAS underwent an extensive psychometric testing that found the survey to be valid and reliable with excellent measurement properties. The PCAS was evaluated using a large study of 6094 participants comparing the primary care performance in different types of health care settings. The PCAS performed consistently well across population subgroups according to age, sex, education, household income, and health status (Safran, et al., 1998).

The PCAS evaluative scales met all tests for five Likert scaling assumptions and therefore the use of Likert's method is appropriate (Safran, et al., 1998). The Likert's method of summated rating assumes that item responses of each scale can be summed without weighting or standardization (Likert, 1932). The five assumptions are:

- 1- Each item need to correlate highly with its hypothesized scale. This is called item- convergent validity. The PCAS met this assumption. All items within each evaluative scale exceeded the accepted minimum correlation needed (0.30) in the population (Nunnally, et al., 1994). Most of the item-scale correlations scored higher than 0.60.
- 2- Items within a scale need to correlate more with their hypothesized scale than with any other scale. This is called item-discriminant validity (Hays, et al., 1990).

The PCAS successfully met this assumption with 100% scaling success for six of the seven evaluative scales.

3- Items within a scale need to have approximately equal means and variances.

This is called equal item variance (Hays, et al., 1990). The PCAS met this assumption. Item means within each scale differed by less than 0.4 and a standard deviation that differed by less than 0.3. The evidence of equal item variance was also supported by the equivalence of the Scott's homogeneity ratio and intraclass correlation coefficient for each scale (Scott, 1968).

4- All items in a scale need to contribute approximately the same proportion of information about the underlying concept. This is called equal item-scale correlation (Likert, 1932). The PCAS met this assumption. The item-scale correlations were narrowly defined.

5- Scales scores need to be reliable or reproducible. This is called internal consistency reliability. The PCAS met this assumption by demonstrating that all scales exceeded the standard for internal consistency reliability for group level comparison ($\alpha = 0.70$) (Nunnally, et al., 1994). Cronbach's alpha ranged from ($\alpha = 0.81$) for financial access scale to ($\alpha = 0.95$) for communication and interpersonal treatment scales.

All PCAS scales were assessed for data completeness. This is necessary to assess the extent to which respondents are willing and able to complete the questionnaire items. This is done by calculating the percentages of both the item-level and scale-level missing data. In general, the missing value rates were low ranging from 0.0% for continuity scale to 4.2% for organizational access scale. The percentage of responses with computable

scores ranged from 98.3% for preventive counseling scale to 99.9% for communication scale.

Score distribution characteristics are important indicators for the variability in responses to survey items. Such variability is an important characteristic for quality assessment and performance evaluation. Measures of variability include differences in mean, standard deviation, skewness, range, the percentage of responses with lowest possible score (the floor effect) and highest possible score (the ceiling effect). The PCAS has demonstrated acceptable variability with a full range of possible scores ranging from 0 to 100. For all multi-item evaluative scales, the percentage of respondents scoring at the floor and ceiling was acceptably low. Report items such as continuity scale and single-item evaluative scale such as thoroughness of physical examination had large ceiling effect. This is mainly a result of fewer response categories in these scales.

Evaluation of interscale correlations was also conducted. In this evaluation, the internal consistency reliability for each scale is compared to the correlation with other scales. If Cronbach's alpha for the scale exceeds its correlation with other scales, this means that the scale is unique and measures a reliable variance. This is also an indication of the distinctiveness of the scale and the ability to report each scale score separately. The PCAS scales had a substantially higher Cronbach's alpha coefficient than interclass correlation. The highest interclass correlation occurred between communication and interpersonal treatment scales (0.86), however, the alpha coefficients for both scales were substantially higher (0.95). These psychometric findings provide evidence for the uniqueness of the concepts measured by each scale in the PCAS.

Use of the Instrument

The PCAS has been widely used in various studies with different populations and in different settings. The survey has been used in a large study comparing the primary care performance under five different health care models: managed indemnity, point of service, network-model health maintenance organization (HMO), group-model HMO, and staff-model HMO (Safran, et al., 2000). The study also aimed at identifying specific health plans characteristics associated with performance variability. The PCAS was able to discriminate between different types of health care settings in their performance. The findings showed statistically significant differences in the overall performance and in each one of the core attributes among low, moderate, and high performer models ($P < 0.05$). Overall, open-model delivery systems performed better than closed-model systems. The study also found that certain model characteristics such as financial incentives, contractual arrangements (capitated payment vs. fee for service), and the use of clinical guidelines are associated with the primary care performance ($P < 0.05$).

The PCAS was also used in a study that examined the association of patient-centered medical home (PCMH) principles and the receipt of preventive services (receipt of cancer screening, lipid screening, influenza vaccination, and behavioral counseling). The study found that the core attributes of primary care, which form the principles of PCMH are associated with receipt of preventive services. More specifically, continuity of care and whole-person orientation are among the highest predictors for the receipt of preventive services. Interestingly, the study also showed that interpersonal and relational aspects of PCMH are more highly correlated with preventive services delivery than are information technology capabilities in community primary care practices (Ferrante, et al., 2010b).

Procedures for Translation and Adaptation

Available Arabic version of the PCAS was used in this study. This Arabic version has undergone forward and backward translation by graduate-level health professionals who are proficient in both Arabic and English (Safran, et al., 1998). The translated version showed high reliability scores (Cronbach's alpha $\alpha = 0.90- 0.94$).

To ensure adaptability to the Saudi health system and cultural context, the Arabic PCAS was further reviewed by Arabic-speaking committee of experts from Saudi Arabia consisting of four PhD-level and master-level health professionals with expertise in primary care and survey research. The committee reviewed the translated instrument for the appropriateness of the wording and meaning of the text to the Saudi context. The goal was to examine whether the questions are applicable to the Saudi health system and whether it is culturally and linguistically appropriate. After collectively reviewing the instrument, the committee agreed that it was a good translation but suggested easy-to-understand alternative wordings for some of the items.

However, the main concern expressed by the committee was the expected respondent burden from such a lengthy survey. In average, it took the committee members 25 minutes to complete the survey. This is considered a high burden and is expected to be higher for a lay person. The committee recommended focusing the survey on the main dimension of primary care quality or using a short version of the survey. Using shorter questionnaire that contains the essential domains can serve the purpose of the study in two ways. First, the low respondent burden can increase response accuracy and completion rate thus improving overall reliability of the study. Second, psychometric analysis of the survey showed that each subscale is unique and measures a distinct domain, which also can be reported separately. For these reasons and committee

recommendations, the study used a short version of the survey which contains 31 items (see Appendix A and B).

To further validate the survey, a pilot study was conducted by interviewing 30 primary care patients using the improved Arabic PCAS from the previous step. The goals of the pilot study were: 1) to test the internal consistency of the instrument, 2) to assess the understandability and feasibility of the Arabic instrument, and 3) to assess the time needed to complete the survey (respondent burden). Patients were asked to complete the instrument and provide their feedback about the instrument. Patients were also asked to identify any troublesome items and make suggestions of how to improve the wording of those items so that it will be easy to understand and answer.

Overall, patient reported that the instrument was easy to understand and complete. Patients were given the choice to complete the questionnaire themselves (self-administered) or to have the interviewer ask them the questions and fill in the answers (interviewer-administered). It took about 10 minutes to complete the self-administered questionnaire and about 15 minutes for the interviewer-administered ones. Cronbach's alpha was conducted to test the internal consistency reliability of the instrument in the pilot study. The overall PCAS scale showed a good reliability ($\alpha = 0.76$). In addition, the seven subscales showed good to excellent reliability. Reliability coefficients for the subscales ranged from $\alpha = 0.68$ for accessibility subscale to $\alpha = 0.94$ for coordination subscale.

Based on patients' feedback and comments as well as the good reliability properties of the instrument, the Arabic PCAS was ready to be administered in the main study.

Cronbach's alpha was again conducted to test the internal consistency reliability of the instrument in the main study. Reliability results are shown in Table 3.1. The total PCAS scale showed a very good reliability ($\alpha = 0.88$). Sub-scales reliabilities ranged from acceptable for accessibility sub-scale ($\alpha = 0.63$) to excellent for continuity sub-scale ($\alpha = 0.91$).

Table 3.1
Internal Consistency Reliabilities of PCAS Total Scale and Sub-Scales

PCAS Scale	Cronbach's alpha Reliability (α)
PCAS Total Scale	0.88
Continuity of Care	0.91
Interpersonal Treatment	0.89
Coordination of Care	0.87
Communication	0.84
Community Orientation	0.72
Comprehensiveness of Care	0.71
Accessibility of Care	0.63

Data Collection Plan

A team of data collectors was recruited to help collect data from patients. The team consisted of four graduate students (2 females and 2 males) from a class of research methods in a college of health sciences in Riyadh. A training session was conducted by the principal investigator to explain the purpose and procedures of data collection. During the training, mock patients recruitment and interviews were conducted by each data collector to demonstrate the skills needed for patients' recruitment and survey administration.

Upon approval of the general administrations of primary care in both CPC and EPC systems, the researcher and data collectors visited each selected center the day before the data collection takes place. The researcher met with the management staff of the center to explain the purpose of the study and procedures for data collection. The researcher also discussed special arrangement with the center's management that can facilitate the data collection process. For example, one arrangement was to designate a private and quite place in the center for patients to complete the survey. Also, the average daily patient visits to the primary care center was obtained to help calculate the interval of patients recruitment using the systematic random sampling in the following day.

In the day of data collection, the researcher and data collectors were present in the primary care center from 9 am to 4 pm every day from Saturday until Wednesday (the regular business days in Saudi Arabia) to begin subjects' recruitment and data collection.

Two inclusion criteria were applied to recruit potential subjects: 1) he/she must be 18 years of age or older and 2) he/she must have visited his/her primary care provider at least once in the last 12 months. These two screening questions were asked to potential subjects before they can participate in the study. The recruitment and data collection procedures were employed as the following:

1- Using the systematic random sampling method, potential subjects were identified according to the pre-calculated interval (i.e. the 5th, the 10th, and so on) as they sign in at the reception office at the primary care center. Once a potential subject was identified, the interviewer approached the potential subject to introduce his/her self and then asked the two screening questions. When the subjects answered "yes" to both questions, the interviewer invited her/him to participate in the study and gave her/him

an information sheet, which included an explanation of the purpose of the study, potential benefits and risks, confidentiality and privacy assurance, voluntary participation and withdrawal notice, expected time to complete the survey, implied consent, and instructions for completing the survey. In addition to the written information, the interviewer explained the information verbally to the potential subject. The potential participants were given enough time and were encouraged to read the information sheet fully and carefully before making their decision to participate. They were also notified verbally and in writing that by completing the survey they agree to participate in the study. The participants were also notified in writing that there were no costs or compensation for participating in the study.

- 2- When the patient agreed to participate, she/he was given the survey and asked to complete the survey while waiting for their appointment. The survey was designed to be self-administered by the patient but also can be interviewer-administered if needed, for example, in case of elderly patients. But in any case, the data collector was available in the center to answer any questions the participant may have.
- 3- When the patient refused to participate or did not meet at least one of the inclusion criteria, then the next 5th visiting patient was recruited and so on.
- 4- The recruitment took place from 9 am to 4 pm every day of the week.
- 5- When a sample of 38 patients was recruited in one primary care center, the data collectors moved to another preselected primary care center. Similar recruitment and data collection procedures were followed in each center.

Data Management and Analysis

Data that was collected each day was coded and entered into SPSS statistical program, Version 22. Data coding and entry was double-checked by another person. Data files were backed up and password-protected. In case of missing data, data was imputed when the respondents answered at least 50 percent of the items in a subscale and then the data was retained for analysis. For example, if the subscale has four items, at least two items must be answered in order to retain the data for that subscale. If the subscale has an odd number of items, more than half the number of items must be answered. For example, a subscale with five items, at least three items must be answered to retain the data.

When the respondent completed at least 50 percent of the subscale, then the missing data was imputed. The imputed value is taken as the respondent's average score across all completed items in the subscale where missing data occurs. This task was conducted after completing the coding of the data including reverse coding when needed. There were a total of 19 cases with missing data that were imputed (3% of the total sample). This was comparable to missing rates (1% to 8%) found in other patient survey studies (Morales, et al., 2003). Results from a sub-analysis excluding the 19 cases with missing data were not different from results of analysis of the full sample with the imputed data.

As a preparatory step for data analysis, an initial frequency analysis was conducted to calculate the mean, standard deviation, minimum and maximum values, and data distribution for each variable. The data was visually inspected for out of range values, normality of distribution, and the presence of outliers. Data errors were then

corrected accordingly. After the data was cleaned and coded appropriately, data analysis was performed.

The goal of the statistical analysis was to explore individual-level and organizational-level factors associated with primary care quality from patients' perspectives. The main outcome variable was the primary care assessment survey (PCAS) total score expressed by means and standard deviations. Secondary outcomes variables included each sub-scale (domain) score.

PCAS total score and each subscale (domain) scores were calculated for each subject. To calculate the raw score of each subscale, the values of all items under each subscale were summed (with reverse coding when appropriate). Then the raw subscale score was transformed to a (0-100), where 0 is the lowest possible score and 100 is the highest possible score. A transformed subscale score (T.S.S.) was computed as follows:

$$\text{T.S.S.} = \frac{\text{actual raw subscale score} - \text{lowest possible raw subscale score}}{\text{raw subscale score range}} \times 100$$

where the subscale score range is equivalent to the highest minus the lowest possible raw subscale score. This process was performed for each subscale in the survey. The total quality score was calculated by summing all transformed domains scores.

Whether it is appropriate to use parametric analysis for data produced by Likert scale is an ongoing debate (Gob, et al., 2007; Norman, 2010). The first school of thought argues that Likert scale is an ordinal-level data and therefore it is most appropriate to conduct non-parametric analysis for this type of data (Gob, et al., 2007). The second school of thought argues that it is appropriate to use parametric analysis for Likert scale

data under certain conditions (Baggaley, et al., 1983; Carifio, et al., 2008). First, the outcome variable needs to meet the normality assumptions. Second, a composite scale of at least 4-6 items must be used and not a single-item scale. Third, the scale needs to contain at least 5-7 response categories. Finally, simulation studies showed that parametric analysis for Likert scale (under the above-mentioned conditions) produced consistent results even after manipulating the distances between the data points on the scale response categories (Baggaley, et al., 1983; Lumley, et al., 2002).

In the current study, the outcome variable did meet the normality assumptions. Descriptive analysis showed no significant skewness or kurtosis in the distribution of the total quality score variable. Additionally, the histogram as well as the Q-Q plot showed a normally distributed outcome variable (Figures 3.1 and 3.2). Furthermore, the regression residuals were normally distributed when plotted against quantiles of standard normal in the P-P plot (Figure 3.3). Finally, the plot of residuals against fitted values showed a random pattern around zero, indicating a homoscedastic residual (Figure 3.4).

Only composite scales of at least 4 items were used to produce the scale scores. Also, all of the items in the scale used 5 or 6 response categories. By verifying those measurement conditions and by meeting the normality assumptions, parametric methods for data analysis were justified in the current study.

The data was summarized using means and standard deviations for continuous data (outcome variables) and frequencies and percentages for categorical and binary data (independent variables). Bivariate analysis was conducted to compare patients' characteristics as well as primary care performance on measures of patient experience between CPC and EPC systems in Saudi Arabia. Series of multivariate multi-level regression analyses were conducted to test the association of patients and organizational

characteristics with patient-reported quality of primary care, while adjusting for differences in the patient case-mix and taking into account the clustering effect of hierarchical data. The topic of multi-level modeling will be discussed in the following chapter.

Protection of Human Subjects

This study involved surveying patients visiting their primary care providers about their care experiences. No medical records data was obtained and no biologic samples were collected. The study was reviewed by the University of Louisville's Institutional Review Board (IRB) and was approved through the Expedited Review Procedure (see Appendix C). The study was also reviewed and approved by IRB offices in the Ministry of Health and the National Guard Health Affairs in Saudi Arabia (see Appendix D and E).

In accordance with IRB requirements, information collected by the survey was kept anonymous. There were no identifiers that could link information to participants' identity. The IRB office waived the requirement for obtaining a signed informed consent from study subjects. The investigator provided each potential subject a copy of the Arabic-translated and IRB approved informed consent sheet that contains information about the study and an implied consent to participate in the study (see Appendix F, G, and H). The implied consent means that after providing all the information to the potential subject and before agreeing to participate, a final sentence stated that "by completing this survey you agree to participate in this study." Each completed questionnaire was assigned a case number that was used in data entry. The collected data

is used solely for research purposes of this study and for future follow-up studies. Data will not be used for any other purposes.

The participation in the study was voluntary and the participant had the choice to participate or withdraw from the study at any time without penalty or loss of benefits that she or he currently receives. A cover letter was included with the survey to explain the purpose of the study and included implied consent to participate, instructions for completing the survey, time to complete the survey, voluntary participation notice, and contact information for the principal investigator. Assistance was offered at the research site in case any participant has any questions to be answered. In addition to the written information, the researcher explained verbally all the information and allowed enough time for the participant to ask questions or clarify any issues before making the decision to participate.

Participants were not in any danger of physical or psychological risk. The study involved no more than minimal risk to study subjects. Survey data was handled securely by the researcher to protect patient privacy and maintain information confidentiality. Information will not be shared with any person or organization and will only be used for research purposes for this study. Data was saved in password-protected electronic files to maintain information security. Only the principal researcher has access to the data. There were no costs incurred to the participant nor was there any compensation given to participate in the study.

CHAPTER IV

RESULTS

Introduction

The main goal of the present study is to assess primary care performance on measures of patients' experience of care in CPC and EPC systems in Saudi Arabia, using the Arabic-translated and adapted Primary Care Assessment Survey (PCAS).

Performance assessment is based on the WHO's framework of primary healthcare systems. This framework defines the core attributes (domains) of high quality primary care, which guides the development of quality indicators specific to primary care. This in turn enables a systematic performance measurement and evaluation of primary healthcare systems.

To achieve this goal, the study has three objectives: 1) to identify area of strengths and weaknesses in processes of primary care as reflected by measures of patients' experience of care in CPC and EPC systems, 2) to assess the extent of variation in measures of patients' experience across the two systems, and 3) to explore factors at both the individual-level and the organizational- level that explain variations in primary care performance.

The purpose of this chapter is to describe the characteristics of patients' population in the study and to present findings addressing the study's three research questions.

1. Univariate/Descriptive Analysis

Characteristics of patient sample/population

Univariate analysis was conducted to calculate frequencies and percentages of each variable in the study. Table 4.1 shows results of univariate analysis, which provides description of demographics, socioeconomic characteristics, health behavior, health status, and healthcare services use of patient population in the study.

The total analytical sample in the study consisted of 596 patients. Among those, 291 (48.8%) participants were between the age of 18 and 35 years. Participants aged between 36 and 50 years accounted for 30.7% (n= 183), while participants aged between 51 and 65 accounted for 12.2% of the total sample (n= 73). Participants older than 65 years old represented 5.3 % of the study sample (n= 31).

Female patients accounted for more than half (54.7%) of study sample (n= 326). Male patients accounted for 43% of the sample (n= 256). Two hundred forty participants reported having less than high school degree (40.3%). There were 183 participants with a high school degree (30.7%) and 106 participants with a college or higher degree (17.8%). The remaining 52 (8.7%) participants reported a diploma or an associate degree.

Non-employment among study participants was 42.8% (n= 255). Employed participants accounted for 40.9% of the sample (n= 244). The remaining 13.3% of the sample reported being a student (n= 79). About a third of participants (33.2%, n= 198) reported a low income (a monthly income of less than 5000 Saudi Riyals, [1 S.R. = 0.27 U.S. Dollar]). More than half (53.9%, n=321) of participants reported a middle income (SR 5000-15000). High income participants (> SR 15000) accounted for 10.2% of the total sample (n= 61).

Self-perceived health status has five categories ranging from poor to excellent health. Fifty two participants (8.7%) reported being in poor health. About seven percent (7.2%) of the study sample reported fair health (n=43). About the third of participants (28.7%) said they were in good health (n= 171), while another 27.2 % of participants perceived their health as very good (n=162). The remaining 25.5% of participants reported excellent health (n= 152). On the other hand, 140 patients reported having one chronic condition (23.5%). Patients who had more than one chronic condition accounted for 45.3% of study sample (n= 270). The remaining 28.3% of the sample reported having no chronic conditions (n= 169). About 25% reported having diabetes, 22% reported hypertension, and 12% reported heart disease.

The study collected data on some health-related life style behaviors including physical exercise, smoking, and life stress. 40.1% of study participants said they rarely exercise (n= 239). 35.1% of participants reported exercising few days of the week (n= 209). The remaining 22.5% said they exercise most days of the week (n= 134). Smokers accounted for 11.3% of participants (n= 67), while 7% of participants used to smoke (n= 42). The majority (79.7%) of participants never smoked (n= 475). 22% of participants reported having high life stress (n= 131). More than half (51.2%) of participants reported some stress in their life (n= 305). The remaining 24.7% of participants reported no life stress (n= 147).

The study collected data on the number of patients' visits to their primary care providers during the past year as an indicator for utilization of healthcare services. The majority of participants (46.3%) reported making five or more visits to their primary care provider in the past year (n= 276). About a third (30.9%) of participants reported making

3 to 4 visits (n= 184) and the remaining 21% reported having 1 to 2 visits in the past year (n= 125).

Finally, the study collected data on the patient-provider relationship using two indicators: the patient-reported longitudinal continuity with the primary care physician and whether patients know the name of their physician, with the latter as indicative of the quality of the relationship. Results suggest poor relationship continuity with primary care providers. More than half (53.4%) of study participants reported being with the same primary care physician for only less than a year (n= 318). 21.5% of participants reported one to two years of continuous relationship with their provider (n= 128). 11.1% of participants reported three to four years (n= 66), while 13.8% of patients reported being with the same physician for five or more years (n= 82).

On the other hand, results suggest a poor quality of patient-provider relationship at the primary care level. The majority (61.7%) of study participants do not know the name of their primary care physician (n= 368). The remaining 38.1% of participants said they know the name of their primary care physician (n= 227). Whether these results favor one type of primary care over another, i.e., CPC vs. EPC, this will be the subject of the next bivariate analysis.

Table 4.1

Description of demographics, socioeconomic status, health behavior, health status, and healthcare services use of the total patient sample in the study (n=596)

Characteristic/ Variable	Frequency n	Percent %	Cumulative Percent
<u>Age</u>			
18-35	291	48.8	48.8
36-50	183	30.7	79.5
51-65	73	12.2	91.7
>65	31	5.3	97.0
Valid	578	97.0	97.0
Missing	18	3.0	100.0
Total	596	100.0	
<u>Gender</u>			
Female	326	54.7	54.7
Male	256	43.0	97.7
Valid	582	97.7	97.7
Missing	14	2.3	100.0
Total	596	100.0	
<u>Education Level</u>			
Less than h. School	240	40.3	40.3
High school	183	30.7	71.0
Diploma/associate degree	52	8.7	79.7
College degree or higher	106	17.8	97.5
Valid	581	97.5	97.5
Missing	15	2.5	100.0
Total	596	100.0	
<u>Employment Status</u>			
Employed	244	40.9	40.9
Not employed	255	42.8	97.0
Student	79	13.3	
Valid	578	97.0	97.0
Missing	18	3.0	100.0
Total	596	100.0	

Table 4.1 Continued

Characteristic/ Variable	Frequency n	Percent %	Cumulative Percent
<u>Household Income</u>			
Low income	198	33.2	33.2
Middle income	321	53.9	68.1
High income	61	10.2	97.3
Valid	580	97.3	97.3
Missing	16	2.7	100.0
Total	596	100.0	
<u>SPHS</u>			
Poor health	52	8.7	8.7
Fair health	43	7.2	15.9
Good health	171	28.7	44.6
V. good health	162	27.2	71.8
Excellent health	152	25.5	97.3
Valid	580	97.3	97.3
Missing	16	2.7	100.0
Total	596	100.0	
<u>Patient-reported co-morbidity</u>			
2 or more chronic diseases	270	45.3	45.3
One chronic disease	140	23.5	68.8
No chronic diseases	169	28.3	97.1
Valid	579	97.1	97.1
Missing	17	2.9	100.0
Total	596	100.0	
<u>Smoking</u>			
Never smoke	475	79.7	79.7
Smoker	67	11.3	91.0
Used to smoke	42	7.0	98.0
Valid	584	98.0	98.0
Missing	12	2.0	100.0
Total	596	100.0	

Table 4.1 Continued

Characteristic/ Variable	Frequency n	Percent %	Cumulative Percent
<u>Physical Exercise</u>			
Rarely	239	40.1	40.1
Few days of week	209	35.1	75.2
Most days of week	134	22.5	97.7
Valid	582	97.7	97.7
Missing	14	2.3	100.0
Total	596	100.0	
<u>Life Stress</u>			
High Stress	131	22.0	22.0
Some Stress	305	51.2	73.2
No Stress	147	24.7	97.9
Valid	583	97.9	97.9
Missing	13	2.1	100.0
Total	596	100.0	
<u>Number of pt. visits to PC in the past year</u>			
1-2 visits	125	21.0	21.0
3-4 visits	184	30.9	51.9
5 or more visits	276	46.3	98.2
Valid	585	98.2	98.2
Missing	11	1.8	100.0
Total	596	100.0	
<u>Patient-reported continuity with physician</u>			
Less than a year	318	53.4	53.4
1-2 years	128	21.5	74.9
3-4 years	66	11.1	86.0
5 or more years	82	13.8	99.8
Valid	594	99.8	99.8
Missing	2	0.2	100.0
Total	596	100.0	

Table 4.1 Continued

Characteristic/ Variable	Frequency n	Percent %	Cumulative Percent
<u>Knows name of physician</u>			
Yes	227	38.1	38.1
No	368	61.7	99.8
Valid	595	99.8	99.8
Missing	1	0.2	100.0
Total	596	100.0	

2. Bivariate Analysis

Bivariate analyses were conducted to answer the first and second part of the first research question (QI-A&B). The first part of the first research question investigated differences in measures of patients’ experience of care, measured by PCAS total score and sub-scales scores (the outcome variables) across CPC and EPC systems (the main exposure variable). However, there may be significant differences in patients’ demographic and socioeconomic characteristics and severity of disease across CPC and EPC systems. These differences in patients’ case-mix may confound the results of QI-A. Therefore, QI-B addressed potential confounders by investigating differences in patients’ characteristics across the two systems. Finally, significant differences in both independent and dependent variables from both bivariate analyses help inform and conduct, in a systematic way, subsequent multivariable analyses to answer the second research question.

A. Comparison of Measures of Patients' Experience of Primary Care

To answer question I-A:

Are there differences in patient reports of their experiences of primary care between the CPC and EPC centers?

bivariate analysis was conducted to compare patient-reported quality scores between the two primary care systems using the independent samples t-test. Difference was considered significant when $p \leq 0.05$.

Table 4.2 shows the results of bivariate analysis comparing measures of patients' experience of primary care in the CPC and EPC systems. These are unadjusted mean differences in total quality score as well as in each of the seven quality domains, in addition to scores of global satisfaction of care.

Overall, results suggest statistically significant differences in scores of patient-reported quality of primary care in total and in each quality domain between CPC and EPC systems. Performance scores favored, on average, the EPC system over the CPC system before any risk adjustments for differences in the patients mix.

The EPC system scored, on average, 6.4 points higher than the CPC system in total PCAS score (mean scores were 58.35 and 51.95 respectively). This difference was statistically significant, $t(593) = 5.80, p < 0.001$. In regards to sub-scales (primary care domains), performance varied significantly between the two systems in six of the seven domains.

On average scores of visit-based continuity, EPC performed better than CPC (60.46 vs. 54.74). This difference was statistically significant, $t(588) = 3.13, p = 0.002$. Even though, both systems of primary care performed poorly in comprehensiveness of

care (EPC scored 42.64 and CPC scored 36.02), performance still, on average, favored the EPC system. The difference was statistically significant, $t(590) = 2.73, p = 0.007$.

Results also show a statistically significant difference in coordination of care, $t(352) = 3.60, p < 0.001$, and in communication, $t(593) = 4.34, p < 0.001$, with performance favoring EPC over CPC in both domains. However, the highest average difference was observed in the domain of interpersonal treatment, with EPC scoring 10.4 points, on average, higher than CPC. This difference was statistically significant, $t(590) = 5.90, p < 0.001$.

Interestingly, the only quality domain in which CPC performed better than EPC was the community orientation. This may reflect the fact that the CPC system is community-oriented by design. On average, CPC scored 44.29 while EPC scored 34.99. This difference was statistically significant, $t(575) = 4.51, p < 0.001$. Finally the EPC and CPC systems performed equally (mean scores were 61.73 vs. 61.38) in accessibility of care domain with no statistically significant difference, $t(594) = 0.24, p = 0.807$.

In terms of the overall patient satisfaction with care, results show that, on average, EPC patients tend to be more satisfied with their primary care provider (mean score of 75.52) than do CPC patients (mean score of 71.37). This difference was statistically significant, $t(581) = 2.22, p = 0.027$.

Table 4.2

Unadjusted mean differences in patient-reported quality of primary care in community-based and employer-based primary care centers, ordered from highest to lowest according to the magnitude of standardized effect size (ES)^{abc}

Primary Care Domain	CPC Mean (SD)	EPC Mean (SD)	<i>t</i>	<i>P</i>	<i>ES</i>
Total quality score (22-95.8)	51.95 (13.41)	58.35 (13.45)	5.80	.000 ^{***}	0.46
Interpersonal Treatment (0-100)	55.95 (20.99)	66.35 (21.86)	5.90	.000 ^{***}	0.47
Coordination of care (0-100)	42.25 (24.66)	51.67 (24.92)	3.60	.000 ^{***}	0.38
Community Orientation (0-100)	44.29 (24.36)	34.99 (25.12)	4.51	.000 ^{***}	0.37
Communication (0-100)	56.62 (22.33)	64.55 (22.18)	4.34	.000 ^{***}	0.35
Visit-based Continuity (0-100)	54.74 (22.69)	60.46 (21.59)	3.13	.002 ^{**}	0.25
Comprehensiveness (0-100)	36.02 (30.76)	42.64 (28.07)	2.73	.007 ^{**}	0.22
Accessibility of care (10-100)	61.38 (15.96)	61.73 (18.64)	0.24	.807	0.02
Global satisfaction of care (0-100)	71.37 (23.10)	75.52 (21.95)	2.22	.027 [*]	0.18

^a CPC, community-based primary care; EPC, employer-based primary care

^b Means were not adjusted for differences in patient mix across CPC and EPC systems

^c Effect size: the difference in means/the standard deviation of the subscale or total scale

* Significant t-test value at $p < 0.05$

** Significant t-test value at $p < 0.01$

*** Significant t-test value at $p < 0.001$

B. Comparison of Patients' Characteristics

To answer question I-B:

Are there differences in demographics, socioeconomic characteristics, health status, and healthcare services utilization among patient populations served by the two primary care systems (CPC and EPC)?

bivariate analysis was conducted to compare patient characteristics between CPC and EPC groups using chi square test, which was indicated to test differences in the study's categorical independent variables. Difference was considered significant when $p \leq 0.05$.

Table 4.3 shows results of bivariate analysis comparing patients' characteristics across CPC and EPC systems. Results show that there is a statistically significant age difference between the two study groups, $\chi^2 (3) = 14.42, p = .002$, with more CPC patients in older age categories than EPC patients. Additionally, there were more female patients in EPC group as compared to CPC patients. This difference is statistically significant at .05 level of significance, $\chi^2 (1) = 6.53, p = .011$. On the other hand, results show no statistically significant differences between CPC and EPC patients in respect to their educational level, $\chi^2 (2) = 7.19, p = .066$; employment status, $\chi^2 (2) = 3.31, p = .191$; or household income, $\chi^2 (2) = 1.43, p = .489$.

In regards to the health status of study's patient population, results show a statistically significant difference in self-perceived health status, $\chi^2 (4) = 7.21, p = .037$, with more patients reporting poor health in CPC groups as compared to EPC group of patients. In a similar direction, this result is further supported by the number of chronic diseases reported by patients. CPC patients reported having more chronic conditions than EPC patients. This difference is statistically significant at the .05 level of significance, $\chi^2 (2) = 8.21, p = .017$. On the other hand, results show no statistically significant

differences between the two study groups in their health-related behaviors such as physical activity, $\chi^2 (2) = 2.63, p = .268$; smoking habits, $\chi^2 (2) = 1.35, p = .508$; and level of life stress, $\chi^2 (2) = 0.21, p = .901$.

With more patients in CPC group reporting poor health and having more chronic conditions, it appears that this was reflected in their utilization of healthcare services. Results show that CPC patients visited their primary care providers more frequently in the previous year than did EPC patients. This difference in healthcare utilization was marginally significant, $\chi^2 (2) = 5.96, p = .051$. However, despite higher health services need and utilization for CPC patients, this was not reflected on the continuity of patient-provider relationship. Results show that CPC patients do not differ from EPC patients in regards to longitudinal continuity with their respective primary care provider. The difference was not statistically significant, $\chi^2 (3) = 6.23, p = .101$.

Finally, EPC patients may have a higher quality relationship with their primary care provider than their CPC counterparts. This is reflected by the finding that more EPC patients know the name of their primary care physician than do CPC patients. The difference was statistically significant, $\chi^2 (1) = 6.13, p = .013$.

Table 4.3

Comparison of demographics, socioeconomic status, health behavior, health status, and healthcare services use among adult patients in community-based and employer-based primary care centers^a

Characteristic	CPC sample (n = 312) n (%)	EPC sample (n = 284) n (%)	χ^2	df	p
<u>Age</u>			14.42	3	.002**
18-35	150 (49.8)	141 (50.9)			
36-50	81 (26.9)	102 (36.8)			
51-65	48 (15.9)	25 (9.0)			
>65	22 (7.3)	9 (3.2)			
<u>Gender</u>			6.53	1	.011*
Female	155 (51.0)	171 (61.5)			
Male	149 (49.0)	107 (38.5)			
<u>Education Level</u>			7.19	3	.066
Less than h. school	111 (36.4)	129 (46.7)			
High school	100 (32.8)	83 (30.1)			
Diploma/associate degree	31 (10.2)	21 (7.6)			
College degree or higher	63 (20.7)	43 (15.6)			
<u>Employment Status</u>			3.31	2	.191
Employed	139 (45.7)	105 (38.3)			
Not employed	127 (41.8)	128 (46.7)			
Student	38 (12.5)	41 (15.0)			
<u>Household Income</u>			1.43	2	.489
Low income	110 (36.3)	88 (31.8)			
Middle income	161 (53.1)	160 (57.8)			
High income	32 (10.6)	29 (10.5)			
<u>SPHS</u>			7.21	4	.037*
Poor health	36 (12.0)	16 (5.7)			
Fair health	21 (7.0)	22 (7.85)			
Good health	83 (27.6)	88 (31.4)			
V. good health	75 (25.0)	87 (31.0)			
Excellent health	85 (28.3)	67 (23.9)			

Table 4.3 Continued

Characteristic	CPC sample (n = 312) n (%)	EPC sample (n = 284) n (%)	χ^2	<i>df</i>	<i>p</i>
<u>Patient-reported co-morbidity</u>			8.21	2	.017*
Two or more chronic diseases	157 (52.3)	113 (40.5)			
One chronic disease	66 (22.0)	74 (26.5)			
No chronic diseases	77 (25.7)	92 (33.0)			
<u>Smoking</u>			1.35	2	.508
Non-smoker	246 (80.7)	229 (82.1)			
Smoker	39 (12.8)	28 (10.0)			
Used to smoke	20 (6.6)	22 (7.9)			
<u>Physical Exercise</u>			2.63	2	.268
Rarely	130 (42.6)	109 (39.4)			
Few days of week	113 (37.0)	96 (34.7)			
Most days of week	62 (20.3)	72 (26.0)			
<u>Life Stress</u>			0.21	2	.901
High Stress	68 (22.4)	63 (22.6)			
Some Stress	157 (51.6)	148 (53.0)			
No Stress	79 (26.0)	68 (24.4)			
<u>Frequency of pt. visits to PC in the past year</u>			5.96	2	.051
1-2 visits	57 (18.6)	68 (24.5)			
3-4 visits	91 (29.6)	93 (33.5)			
5 or more visits	159 (51.8)	117 (42.1)			

Table 4.3 Continued

Characteristic	CPC sample (n = 312) n (%)	EPC sample (n = 284) n (%)	χ^2	<i>df</i>	<i>p</i>
<u>Patient-reported continuity with physician</u>			6.23	3	.101
Less than a year	157 (50.6)	161 (56.7)			
1-2 years	67 (21.6)	61 (21.5)			
3-4 years	33 (10.6)	33 (11.6)			
5 or more years	53 (17.1)	29 (10.2)			
<u>Knows name of physician</u>			6.13	1	.013*
Yes	104 (33.4)	123 (43.3)			
No	207 (66.6)	161 (56.7)			

^a CPC, community-based primary care; EPC, employer-based primary care

* Significant Chi-square value at $p < 0.05$

** Significant Chi-square value at $p < 0.01$

3. Multivariable Analysis

Previous bivariate analyses have indicated significant variations in patient-reported quality of primary care between the two types of primary care providers. The next analytical step aims to identify factors both at the individual-level and organizational-level that explain those quality variations. This is the subject of the study's second research question:

What are the factors, at both the patient-level and organizational-level that explain variations in measures of patients' experience of care across CPC and EPC centers?

To answer this question, a series of multivariable regression analyses were conducted. Because of the hierarchical structure of data, a special multi-level analysis was indicated. The following section will address this point in details.

A. Introduction to Multi-level Modeling

In the social world, many groups naturally exist in a nested or hierarchical social structure. For example, students are nested within schools, families are nested within neighborhoods, and patients are nested within primary care centers. From a theoretical point of view, behavioral, health, and social sciences have increasingly acknowledged the importance of contextual influences on human behavior, health, and life experiences (Lake, 2006; Smith, 2011; Snijders, et al., 2012). The multi-level nature of these theories is best addressed using appropriate multi-level research methods in order to capture the complexity of relationships between group members and the context to which they belong (Luke, 2004; Snijders, et al., 2012).

Collecting data from individuals nested within groups inherently includes data that is hierarchical in structure, with individual observations at the lower level and group

characteristics at the higher level of the hierarchy. Multi-level analysis (also referred to as Hierarchical Linear Modeling or HLM) takes into account the hierarchical nature of data by explicitly modeling each variable at its own natural level of observation. This allows for the simultaneous examination of the effects of group-level and individual-level variables on the outcome of interest (Goldstein, 2011; Raudenbush, et al., 2002). HLM treats each level of data as a potential source of unexplained variability.

The current study collected data from patients nested within primary care centers. The study also collected information about primary care providers. Patients' characteristics and observations make up the individual-level variables, while characteristics of primary care providers represent group-level variables. Therefore, the resultant two-level data structure may require multi-level analysis.

However, before determining that HLM is the appropriate analytical approach, we need to test whether data is in fact hierarchically structured and whether a multi-level model is even needed in the first place (Luke, 2004; Raudenbush, et al., 2002). In other words, we need to answer the question about whether there is a significant group-level effect on the outcome of interest. This can be tested by conducting an empty (null) HLM model (Luke, 2004; Raudenbush, et al., 2002). This model allows the intercept (mean quality score) of each group to vary without including any predictors, hence the name empty.

The resultant output yields two important parameters: the total between-groups variance and the within-group variance. These are called variance components. If the between-groups variance is statistically significant as determined by the Intraclass Correlation Coefficient (ICC) value and the corresponding ANOVA test (testing if F test statistic is significant using $p < 0.05$ level of significance), then this highlights the

importance of group-level effect and the need for HLM (Snijders, et al., 2012). On the other hand, if the empty model shows that the between-groups variance is not statistically significant, then it suggests that there are no important group effects. In this case, the ordinary single-level regression is appropriate to conduct the analysis (Snijders, et al., 2012).

If HLM is indicated by the presence of significant group-level variance, fitting of successive models includes adding predictors to the model starting from the bottom up and using backward elimination, i.e., adding all individual-level variables and applying backward elimination for this level first, and then adding all the group-level variables and applying backward elimination for this level as well (Luke, 2004; Snijders, et al., 2012). The goal is to explore variables both at the individual and group-level that may explain variations in the dependant variable. At each step of the model building, we assess the impact of added predictors on the within-groups and between-groups variances. Particular attention is given to the group-level variance. If this variance remains significant (using $p < 0.05$ significance level), this indicates the need to explore other group-level factors that may be responsible for this variation. At any step of the analysis, when this variance is deemed non significant, this indicates that the observed variation have been explained by the variables in the final model, or that group effects on the outcome are no longer significant.

B. Assessing the Need for a Multi-level Model

The empty model can be specified using the following regression equations:

$$\text{Level 1: } Y_{ij} = \beta_{0j} + r_{ij} \quad \text{Equation 4.1}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{00} + \mu_{0j} \quad \text{Equation 4.2}$$

The combined (mixed) effects model is then:

$$Y_{ij} = \gamma_{00} + \mu_{0j} + r_{ij} \quad \text{Equation 4.3}$$

Where:

Y_{ij} is the PCAS score for the i th patient in the j th center

β_{0j} is the mean PCAS score for the j th center

γ_{00} is the grand mean of PCAS scores across all centers, i.e. the mean of the means

μ_{0j} is the specific effect of group j , the deviance of each group mean from the grand mean

r_{ij} is the residual effect of i th individual in the j th center, the deviance of each individual score from its group mean

Notice that in HLM notations:

subscript (i) indicates level-one unit (e.g., individual) and,

subscript (j) indicates level-two unit (e.g., group).

Additionally, it is assumed that the group effects μ_j have population mean 0 and population variance σ^2_μ (the between-group variance), and the residuals r_{ij} have mean of 0 and variance σ^2_r (the within-group variance).

Equation 4.3 above does not contain any level-one or level-two predictors, thus allowing us to estimate the null model.

Empty (null) model (Model 1) was fitted allowing the intercept (mean PCAS score) to randomly vary across centers without including any explanatory variables. From this model, we obtained three parameter estimates: the grand mean γ_{00} , level-two variance σ^2_{μ} , and level-one residual σ^2_r , along with their significance testing.

Here, we test the null hypothesis that there is no variation in PCAS scores between groups:

$$H_0: \sigma^2_{\mu} = 0$$

, versus the research hypothesis that there is a significant variation in PCAS scores between groups:

$$H_1: \sigma^2_{\mu} > 0$$

Table 4.5 show results of Model 1. We are interested in the variance components that will allow us to calculate the ICC, which is basically a measure of group effect, or the proportion of variance that is between groups. The higher the ICC, the larger the group effect, which indicates the need for multi-level analysis.

Calculating the ICC

ICC can be calculated using the following formula:

$$\begin{aligned} \text{ICC} &= \frac{\text{Between-group variance } (\sigma^2_{\mu})}{\text{Total variance } (\sigma^2_{\mu} + \sigma^2_r)} && \text{Equation 4.4} \\ &= \frac{17.2}{191.6} \\ &= .09 \end{aligned}$$

This means that about 9% of the variance can be explained by group-level variables.

To test the significance of the ICC, we conducted a one-way ANOVA test of the within-groups and between-groups variance in total quality score (Snijders, et al., 2012). Results in Table 4.4 show that ICC is significant, F -test (15, 579) = 4.6, $p < 0.001$.

Table 4.4
ANOVA test Results

Variance Components	Sum of Squares	Mean Square	F	df	P
Between Groups	12095.5	806.3	4.6	15	0.000 ^{***}
Within Groups	101002.1	174.4		579	
Total	113097.6			594	

^{***} $p < 0.001$

This result is indicative of the presence of group-level effect and the need to explicitly model level-2 random effect using HLM. Ignoring the hierarchical structure of data yields inaccurate parameter estimates and underestimated standard errors (spuriously small standard errors), which then leads to inflated significance (spuriously small p value) with the associated misleading interpretations (Raudenbush, et al., 2002).

We hypothesized that patient-level predictors will explain much of the within-centers variability. We also hypothesized that organizational-level predictors will explain much of the between-centers variability, after controlling for differences in patient characteristics in each center.

Regression equation to predict total quality score (PCAS_{Total}) using Model 1 is expressed as follows:

$$\text{PCAS}_{\text{Total}} = 55.1 + \mu_{0j} + r_{ij} \quad \text{Equation 4.5}$$

Model Specifications

Successive HLM models were specified starting from the bottom-up and using backward elimination, i.e. adding all individual-level variables at once and applying backward elimination for this level first, and then adding all the group-level variables at once and applying backward elimination for this level as well. A significance level of 0.05 was used as the criterion to remove variables from the model. Variables with non-significant regression coefficients ($p > 0.05$) were removed from the model. In addition to main effects, interaction effects were also tested using the following steps, 1) using backward elimination, all level-1 variables were added and assessed for significance, removed non-significant ones and refitted the model, 2) interaction terms were included in addition to the main effects of level-1 variables and assessed for significance as well as the overall model fit using the deviance test, removing the non-significant terms and refitting the model. Once the best fit model was reached, level-2 variables were added, 3) using the same method of backward elimination above (step 1 and 2), I examined the main effects and interaction effects of level-2 variables (including both main and direct effects at the same time), removing the non-significant terms and refitting the model until the best fit model was reached. Up until now, this was examination of main effects and interaction effects for each level separately (same-level interactions). Now moving to the cross-level interactions, 4) interaction terms between each one of level-2 variables were created with each one of level-1 variables. Again using backward elimination, I examined the significance of cross-level interaction terms while keeping all the main effects for level-1 and for level-2 variables in the model, removing the non-significant terms and refitting the model until the best fit model was reached.

Model 2 was fitted by adding all level-1 predictors and using backward elimination method described above. Results from Model 2 are shown in Table 4.5. There were no interaction terms at level-1 that contributed significantly to the improvement of the model. Also, there were no multicollinearity between level-1 variables as indicated by small values of variance inflation factor ($VIF < 3$).

Assessing the Model Fit

A- Model Deviance

To assess the model goodness of fit, we compared the deviance of Model 2 (larger model with more parameters) with the deviance of Model 1 (the smaller model with intercept only). Generally speaking, the smaller the deviance, the better the model fit. We can test the significance of the change in deviance using the chi-square test (Luke, 2004).

Here we test the null hypothesis that the difference in deviance between the two models is not significant, i.e. the larger model is not a better fit than the smaller model:

H_0 : models are the same.

, versus the research hypothesis that the difference in deviance is significantly bigger than zero and that the larger model is a better fit for the data:

H_1 : larger model has smaller deviance

First, we calculated the difference:

$$Dev_1 - Dev_2 = 4781.1 - 4502.2 = 279.1.$$

The p value is then estimated using the table of chi-squared distribution with degrees of freedom (df) equal to the difference in the number of parameters between the two models. So, $df = 12 - 3 = 9$.

The result shows that Model 2 is a better fit for the data than Model 1, $\chi^2 (9) = 279.1, p < 0.001$.

The regression equation for Model 2 is expressed as follows:

$$\begin{aligned} \text{PCAS}_{\text{Total}} = & 58.6 + 4.2 (\text{Knowing physician's name})_{ij} - 3.0 (\text{Gender}_{(F=1, M=0)})_{ij} \\ & - 1.8 (\text{Patient-reported co-morbidity}_{(0-9)})_{ij} - 1.3 (\text{SPHS}_{(\text{Excellent}=1, \dots, \text{Poor}=5)})_{ij} \\ & + 1.1 (\text{Patient-reported continuity}_{(<1\text{year}=1, \dots, \geq 5\text{years}=5)})_{ij} + \mu_{0j} + r_{ij} \end{aligned} \quad \text{Equation 4.6}$$

B- Explained Variance R²

We estimated the explained variance from Model 2 at each level of the analysis using the following formula:

$$R^2 = \frac{\text{Variance}_{\text{Model 1}} - \text{Variance}_{\text{Model 2}}}{\text{Variance}_{\text{Model 1}}} \quad \text{Equation 4.7}$$

Thus, R^2 for level-1:

$$\begin{aligned} &= \frac{174.4 - 152.3}{174.4} \\ &= 0.13 \end{aligned}$$

This means that 13 % of the observed level-1 variance was explained by adding level-1 predictors in Model 2.

Similarly we calculate R^2 for level-2 from Model 2 (only level-1 variables added):

$$\begin{aligned} &= \frac{17.2 - 16.3}{17.2} \\ &= 0.05 \end{aligned}$$

While we expect that individual-level variables would mainly impact individual-level residual (within-group variance) and not so much the between-group variance, the result above shows that 5% of the observed between-group variance has been explained by including patient-level predictors in Model 2. This makes sense because by accounting for differences in patient characteristics (also called case mix adjustment) across all primary care centers, we expect that differences in quality of care between- centers will diminish. This is due to the fact a proportion of the between-centers variability is purely attributable to differences among patients themselves and not to “true” differences in performance. This line of reasoning is why case mix adjustment is becoming highly important for performance evaluation in health services research.

However, Model 2 suggests that significant quality variation between primary care centers remained unexplained by level-1 predictors. This indicates the need to add level-2 predictors to Model 2 to build Model 3 to explain the remaining variability. So, all level-2 predictors were added to Model 2. The model was further improved by removing non-significant level-2 variables and refitting the model. Table 4.5 shows the results of fitting Model 3.

Model 3 shows improvement in the goodness of fit as indicated by the significant reduction in model deviance, $\chi^2 (2) = 33.5, p < 0.001$. The inclusion of level-2 predictors (Model 3) did not explain much of the remaining level-1 variance, which is expected. However, it did explain a significant portion of the remaining level-2 variance from Model 2 ($R^2 = 0.77$). In other words, Model 3 explained 77% of the unexplained between-centers variability in performance on patient experience of care.

Next, in successive HLM models, we allowed each significant level-1 predictor from Model 3 to have a varying slope and tested the significance of the varying slopes. This is called a random intercept, random slope model. Next, we added a cross-level interaction terms for level-1 variables with significant random slope. This tests the significance of moderation effect, i.e., whether level-2 predictors moderate the relationships between level-1 predictors and the outcome variable.

None of level-1 variables had significant random slopes. Also, there were no significant cross-level interactions. Therefore, Model 3 was the best fitted model with the lowest model deviance and that explained most of the multi-level variability in total quality score. Equations for the final model to predict scores of patients' experience of primary care (PCAS_{Total}) are expressed as follows:

First, level-1 equation:

$$\begin{aligned} \text{PCAS}_{\text{Total}} = & \beta_{0j} + \beta_{1j}(\text{Knowing physician's name})_{ij} + \beta_{2j}(\text{Gender})_{ij} \\ & + \beta_{3j}(\text{Patient-reported co-morbidity})_{ij} + \beta_{4j}(\text{SPHS})_{ij} \\ & + \beta_{5j}(\text{Patient-reported continuity})_{ij} + r_{ij} \end{aligned} \quad \text{Equation 4.8}$$

Second, level-2 equation:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Practice Type})_j + \gamma_{02}(\text{Prop. of family physicians in the center})_j + \mu_{0j}$$

and

$$\beta_{1j} = \gamma_{10}, \beta_{2j} = \gamma_{20}, \beta_{3j} = \gamma_{30}, \beta_{4j} = \gamma_{40}, \beta_{5j} = \gamma_{50} \quad \text{Equation 4.9}$$

Third, the combined (mixed) effects model is then:

$$\begin{aligned} \text{PCAS}_{\text{Total}} = & \gamma_{00} + \gamma_{01} (\text{Practice Type})_j + \gamma_{02} (\text{Prop. of family physicians in the center})_j \\ & + \beta_{1j} (\text{Knowing physician's name})_{ij} + \beta_{2j} (\text{Gender})_{ij} + \beta_{3j} (\text{Patient-reported co-morbidity})_{ij} \\ & + \beta_{4j} (\text{SPHS})_{ij} + \beta_{5j} (\text{Patient-reported continuity})_{ij} + \mu_{0j} + r_{ij} \end{aligned} \quad \text{Equation 4.10}$$

By inserting parameter estimates from the final model to the equation, we get:

$$\begin{aligned} \text{PCAS}_{\text{Total}} = & 56.1 + 4.3 (\text{Practice Type}_{(\text{EPC}=1, \text{CPC}=0)})_j + 4.6 (\text{Proportions of family} \\ & \text{physicians in the center})_j + 3.9 (\text{Knowing physician's name})_{ij} - 3.0 (\text{Gender}_{(\text{F}=1, \text{M}=0)})_{ij} \\ & - 1.7 (\text{Patient-reported co-morbidity}_{(0-9)})_{ij} - 1.3 (\text{SPHS}_{(\text{Excellent}=1, \dots, \text{Poor}=5)})_{ij} \\ & + 1.1 (\text{Patient-reported continuity}_{(<1\text{year}=1, \dots, \geq 5\text{years}=5)})_{ij} \end{aligned} \quad \text{Equation 4.11}$$

To test the normality assumptions for Model 3, the P-P plot for residuals against quantiles of standard normal was inspected. Problems with heteroscedasticity were assessed by plotting standardized residuals against fitted values. The P-P plot shows that final model's residuals are quite normal (Figure 3.3). The plot of residuals against fitted values shows equally distributed residuals around zero, which means that the final model has met the homoscedasticity assumption (Figure 3.4).

Interpretations of Multi-level Results

The final model, Model 3, explained 14% of the observed variability within primary care centers and 78% of the observed variability between primary care centers in scores of patients' experience of primary care. On average, the EPC system scored significantly higher than the CPC system in total scores of patients' experience, after controlling for differences in both patient characteristics (level-1 variables) and organizational characteristics (level-2 variables) and taking into account the multi-level

structure by means of multi-level modeling. Adjustments for patients' characteristics included demographics, socioeconomic characteristics, self-perceived health status, visit frequency, and longitudinal continuity with the doctor. Adjustments for organizational characteristics included practice size, utilization rate, population size, and having family physicians in the practice.

To further assess the impact of confounding on the association between the main explanatory variable (practice type) and the outcome variable (total score of PCAS), a crude regression model that only included practice type and PCAS total score was specified. This helps to obtain an unadjusted estimate of the regression coefficient (B) of the variable practice type. This allows us to compare, using eyeball exam, the magnitude of the unadjusted B in the crude model to the magnitude of the adjusted B in the full model. The result from the crude model showed an unadjusted regression coefficient of ($B=6.4, p < 0.01$), while the adjusted regression coefficient in the full model was ($B=4.3, p < 0.05$). The unadjusted B was significantly higher than the adjusted B . The magnitude of difference ($\Delta = 2.1$) between the unadjusted and adjusted regression coefficients indicates the impact of confounding and the need to adjust for confounding variables in the full model.

The total average (grand mean) of scores of patients' experience for all primary care centers in the study was 55.1. EPC system scored, on average, 4.3 points higher than CPC system on total scores of patients' experience with care (Total PCAS_{EPC} = 60.4, 95% CI [± 2.9] vs. Total PCAS_{CPC} = 56.1, 95% [± 3.3], $p = 0.009$) based on the final model. Additionally, regardless of being CPC or EPC, higher proportions of family physicians in a center were statistically significantly associated with 4.6 points increase in scores of patients' experience (95% CI [± 3.1], $p < 0.007$). Other organizational

characteristics such as practice size ($p=0.77$) and utilization rate ($p=0.38$) were not significantly associated with patients' experience of care.

Patients' experience was also statistically significantly associated with gender, patient-perceived health status, patient-reported co-morbidity, patient-reported longitudinal continuity with physician, and knowing the name of physician. Female patients reported 3.0 points (± 2.1) lower in scores of patients' experience than males ($p = 0.006$). Poor SPHS was statistically significantly and negatively associated with patients' experience ($p = 0.011$). Similarly, more co-morbid conditions reported by patients were statistically significantly associated with worse patients' experience ($p < 0.001$).

Being with the same primary care physician for longer durations was statistically significantly associated with better patients' experience ($p = 0.004$). Similarly, knowing the name of primary care physician was associated with better patients' experience ($p < 0.001$).

Further analysis (Table 4.6) compared the adjusted performance on each primary care domain between the CPC and EPC systems. All primary care subscales (domains) showed normally distributed data as indicated by standard normal histograms and Q-Q plots. Patient global satisfaction scale, however, showed a negatively skewed distribution (Figures 3.5 and 3.6). This is because the scale exhibited a high ceiling effect (observations are concentrated at the upper end of scale). In other words, most patients tend to give high ratings of satisfaction of care. This was not the case with measures of patient experience (the main scale in the current study).

All performance scores are reported in a scale of 0-100 points, with higher scores reflecting better performance. All scales scores were adjusted for differences in patients' characteristics between the CPC and EPC systems and for the clustering effect of the

hierarchical data. Overall, CPC performed significantly better than the EPC in two primary care domains, community orientation (Mean_{CPC} = 47.8, 95% [± 5.7] vs. Mean_{EPC} = 35.5, 95% [± 6.2], $p = 0.003$) and accessibility of care (Mean_{CPC} = 67.4, 95% [± 5.7] vs. Mean_{EPC} = 63.5, 95% [± 4.5], $p = 0.025$). On the other hand, EPC performed significantly better than CPC in other two primary care domains, interpersonal treatment (Mean_{EPC} = 68.3, 95% CI [± 6.3] vs. Mean_{CPC} = 59.5, 95% CI [± 5.9], $p = 0.024$) and communication quality (Mean_{EPC} = 69.8, 95% CI [± 4.9] vs. Mean_{CPC} = 64.4, 95% CI [± 5.5], $p = 0.035$). There were no significant differences between CPC and EPC in coordination of care ($p = 0.098$), comprehensiveness of care ($p = 0.208$), and visit-based continuity of care ($p = 0.354$).

The magnitude of the difference between primary care systems as measured by the standardized effect size (d) ranged from 0.16 to 0.50. Overall, the largest differences were those associated with community orientation ($d = 0.50$ favoring CPC and interpersonal treatment ($d = 0.36$ favoring EPC). The smallest and non-significant differences were those associated with continuity of care ($d = 0.16$ favoring EPC) and comprehensiveness of care ($d = 0.21$ favoring EPC).

Finally, Table 4.7 shows an exemplary table of estimated expected scores of patient experience for selected cases of patients attending CPC and EPC systems based on the final predictive model. Scores were estimated using the following final equation:

$$\begin{aligned}
 \text{PCAS}_{\text{Total}} = & 56.1 + 4.3 (\text{Practice Type}_{(\text{EPC}=1, \text{CPC}=0)})_j + 4.6 (\text{Proportions of family} \\
 & \text{physicians in the center})_j + 3.9 (\text{Knowing physician's name})_{ij} - 3.0 (\text{Gender}_{(\text{F}=1, \text{M}=0)})_{ij} \\
 & - 1.7 (\text{Patient-reported co-morbidity}_{(0-9)})_{ij} - 1.3 (\text{SPHS}_{(\text{Excellent}=1, \dots, \text{Poor}=5)})_{ij} \\
 & + 1.1 (\text{Patient-reported continuity}_{(<1\text{year}=1, \dots, \geq 5\text{years}=5)})_{ij}
 \end{aligned}
 \tag{Equation 4.11}$$

Table 4.5
Hierarchical Linear Modeling Results^a

Predictors	Model 1	Model 2	Model 3
<u>Fixed Effects</u>			
Intercept	53.1 ^{***}	58.6 ^{***}	56.1 ^{***}
<i>Individual-level Predictors</i>			
<u>Gender</u>			
Male	N/A	Ref	Ref
Female		-3.0 ^{**}	-3.0 ^{**}
<u>Health Status</u>	N/A	-1.3 [*]	-1.3 [*]
<u>Patient-reported co-morbidity</u>	N/A	-1.8 ^{***}	-1.7 ^{***}
<u>Patient-reported continuity</u>	N/A	1.1 ^{**}	1.1 ^{**}
<u>Patient knows the physician's name</u>			
No	N/A	Ref	Ref
Yes		4.2 ^{***}	3.9 ^{***}

Predictors	Model 1	Model 2	Model 3
<i>Group-level Predictors</i>			
<u>Practice Type</u> CPC EPC	N/A	N/A	Ref 4.3**
<u>Proportions of family physicians in the center</u>	N/A	N/A	4.6**
<u>Practice Size</u> Small Large	N/A	N/A	Ref -0.5
<u>Utilization Rate</u> Low High	N/A	N/A	Ref 1.4
<u>Variance components</u>			
Level-2 (intercept) variance	17.2*	16.3*	3.7
Slope variance	N/A	N/A	N/A
Level-one variance	174.4***	152.3***	149.9***
<u>Model Fit</u>			
Deviance	4781.1	4502.2	4468.7
(Dev _a -Dev _b)	28.9***	279.1***	33.5***

a. Dependent Variable: PCAS Total Score (0-100)

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

N/A: Not added to the model

Table 4.6

Adjusted means of total PCAS score and subscales scores across primary care providers, ordered from highest to lowest according to the magnitude of standardized effect size^{abc}

Primary Care Domain	CPC Mean (SE)	EPC Mean (SE)	Effect Size
Total quality score (22-95.8)	56.11 (1.71)*	60.41 (1.49)*	0.31
Community Orientation (0-100)	46.92 (2.95)*	34.34 (3.18)*	0.50
Interpersonal Treatment (0-100)	61.60 (2.95)*	69.65 (3.18)*	0.36
Coordination of care (0-100)	46.20 (4.98)	52.32 (3.45)	0.24
Accessibility of care (10-100)	67.30 (2.94)*	63.34 (1.52)*	0.23
Communication (0-100)	65.71 (2.85)*	70.65 (2.08)*	0.22
Comprehensiveness (0-100)	20.57 (6.30)	27.07 (4.94)	0.21
Visit-based Continuity (0-100)	57.98 (3.42)	61.66 (2.14)	0.16
Global satisfaction of care (0-100)	77.11 (3.52)	78.81 (4.02)	0.07

^a CPC, community-based primary care; EPC, employer-based primary care

^b Means were adjusted for differences in patient mix across CPC and EPC systems and for clustering effect by means of multi-level modeling

^c Effect size: the difference in means/the standard deviation of the subscale or total scale

* $p < 0.05$

Table 4.7

An exemplary table of estimated expected scores of patient experience for selected cases of patients attending CPC and EPC systems based on the final predictive model

Patient Case Scenario	Estimated expected scores of patient experience if attending CPC (95%CI)	Estimated expected scores of patient experience if attending EPC (95%CI)
A female patient with poor health status and two chronic diseases who does not know her doctor's name and has been with the same doctor for less than one year in a clinic with no practicing family physicians	41.11 (37.76 - 44.46)	45.41 (42.49 - 48.33)
The same female patient above but now she knows her doctor's name and has been with the same doctor for more than five years in a clinic with practicing family physicians	53.70 (50.35 - 57.05)	58.00 (55.08 - 60.00)
A male patient with good health status and one chronic disease who does not know his doctor's name and has been with the same doctor for nine months in a clinic with practicing family physicians	56.77 (53.42 - 60.12)	61.07 (58.15 - 63.99)
The same male patient above in the same clinic but now knows his doctor's name and has been with the same doctor for six years	64.46 (61.11 - 67.81)	68.76 (65.84 - 71.68)

Summary of Results

Overall, results suggest that there are significant variations between CPC and EPC primary care systems in regards to the characteristics of patient population they serve, their organizational characteristics, and measures of patient experience of primary care.

CPC system serves relatively older population with poorer health status than the EPC system. This also was reflected in the utilization of health services, with the CPC system providing care to more patients per day than the EPC system. On the other hand, no differences were found between the two systems in terms of patients' education level, employment status, income, and health behaviors.

The unadjusted comparisons between the two systems in the total quality score and the seven primary care domains show higher performance of EPC over CPC. The only domain the CPC performed better than EPC is the community orientation. This may reflect the fact that CPC system is a community-based system by design. Better performance of the EPC system in most of the primary care domains was also reflected in higher patient satisfaction scores as compared to the CPC system. Accessibility of care did not differ significantly by system.

The favorable primary care performance for the EPC system was reduced after controlling for differences in patient and organizational characteristics as well as the clustering effect by means of multivariable, multi-level analysis. As compared to the unadjusted comparison which showed superior performance of EPC in five domains, the adjusted comparison shows that EPC performed significantly better in two primary care domains, interpersonal treatment and quality of communication, in addition to the total performance score. On the other hand, in addition to better community orientation, CPC system performed significantly better in accessibility of care after the adjustment.

Both the practice type and proportions of family physicians in a center have emerged as strong predictors of measures of patients' experience. Moreover, higher proportions of family physicians in a center remained a strong predictor of better patient experience even after controlling for the practice type. This was not the case for other organizational characteristics such as practice size and utilization rate, which did not predict performance.

Patients' characteristics that negatively influenced patient rating of quality of care include being female, reporting poor health, and reporting co-morbid conditions. Finally, two aspects of care that seem to improve patient experience of care are being with the same primary care physician for longer relationship durations (a measure of continuity of care) and knowing the name of physician (a measure of quality of relationship).

Discussion of these key findings will follow in the next chapter.

CHAPTER V

DISCUSSION

The purpose of the study was to assess primary care performance on measures of patient experience in Community-based Primary Care (CPC) and Employer-based Primary Care (EPC) systems in Saudi Arabia, to examine variations in performance across the two systems, and to explore factors at both the individual-level and the organizational-level that explain variations in primary care performance. Performance assessment of the primary care system was based on surveys of patients' experience with primary care providers from differing systems. Patients' experience was measured by the Primary Care Assessment Survey (PCAS), which operationalizes the WHO's framework of effective primary healthcare systems (Safran, et al., 1998).

Key Findings

The study identified several key findings. First, patient experience of care was significantly and positively associated with the quality of the patient-doctor relationship and the continuity of that relationship. Patients who know their physicians' names (an indicator of good quality relationship) reported better patient experience than those who do not. Additionally, patients who have been with their regular primary care physicians for extended durations (a measure of relationship continuity) reported better experience of care when compared to patients who have been with their physicians for only short durations.

Second, the type of primary care practice was associated with measures of patient experience, with overall performance favoring the EPC system over the CPC system. This superior performance of the EPC system was reduced but remained statistically significant after adjusting for differences in patient characteristics (confounders) across the two systems and taking into account the clustering effect by means of multi-level analysis. The adjustment reduced the number of the statistically significant quality domains in which EPC performed better than CPC from the five domains in the unadjusted comparison to two domains in the adjusted comparison. These include indicators for interpersonal treatment and quality of communication. On the other hand, the adjustment for confounding resulted in statistically significant higher performance of the CPC system in indicators for accessibility of care and community orientation as compared to the EPC system. The two systems did not significantly differ in their performance on the remaining domains: continuity of care, comprehensiveness of care, and coordination of care. I can fairly say that the EPC system performed better in relational aspects of care, while the CPC system performed better in the organizational aspects of care (e.g., better access to care).

Third, regardless of the practice type, higher proportions of family physicians in a center were associated with better patients' experience of primary care. This may partially explain why the EPC system performed better than the CPC system, especially in interpersonal and relational aspects of care, knowing that the EPC system employs more family physicians than general practitioner as compared to the CPC system.

Identifying those organizational characteristics that are associated with improved primary care performance is one of the study's objectives. Both EPC and CPC systems can learn from each other especially in aspects of care that show the potential to improve

the quality and outcomes of primary care. Policy implications will be discussed in details later in the chapter.

Fourth, identifying patients' characteristics that may influence ratings of patients' experience of care such as health status and co-morbidity is another of the study's objectives. Particularly, if we are going to use surveys of patient experience as an indicator of performance, it is important for health systems researchers and policy makers to understand the need for risk adjustment in performance measurement. Risk adjustment can prevent penalizing primary care providers for lower performance just because they serve sicker or lower income populations. Wrong judgments based on unadjusted performance evaluations negate the basic purpose of primary care to outreach and provide health services to disadvantaged populations.

Characteristics of Patients' Sample/Population

Comparing the study sample to the population from which it was drawn can help in the assessment of the generalizability of study findings. The study was conducted in the city of Riyadh, the capital and largest city in Saudi Arabia with an estimated population of 5.7 million in 2013 (The High Commission for The Development of Arriyadh, 2013). However, because of the lack of city-level data describing population socioeconomic characteristics, the Saudi population will be used as the referent population. As compared to the general Saudi population for the year of 2012 (Central Department of Statistics and Information, 2012), the study sample had a comparable age structure but with more patients in the older age groups. The study sample had 5.3% of participants aging 65 years and older, while this age group accounted for 3.9% in the general public. The 51-65 age group accounted for 12.2% in the sample and 12.4% in the

general public. The 36-50 age group accounted for 30.7% in the sample and 34% in the general population. Finally, the 20-35 age group accounted for 40.3% in the sample and 37.4% in the general population.

The female-to-male ratio in the sample was higher than that in the general public. In the sample, the female to male ratio was 1.27, while this ratio was 0.99 in the general public in 2012 (Central Department of Statistics and Information, 2012). Study participants were slightly more educated than the general public. Persons with less than high school accounted for 40.3% in the sample and constituted 50.7% in the population. Persons with high school accounted for 30.7% in the sample and 27.7% in the population. Those with diploma/associate degree accounted for 8.7% in the sample and 4.2% in the population. Finally, persons with college and higher degrees accounted for 17.8% in the sample and 17.2% in the population (Central Department of Statistics and Information, 2012).

The unemployment rate in the sample was 42.8%, which is significantly higher than the 12.10% unemployment rate in the population (Central Department of Statistics and Information, 2012). The higher female-to-male ratio in the sample may have contributed to higher rates of unemployment, which disproportionately affects females in Saudi Arabia. This is further supported by categorizing unemployment rates by gender in the sample. Results showed that in the sample, unemployment rate among females was 79.1%, while this rate was 8.3% among males.

The distribution of family income of study's participants closely matches that of the general public. Participants who reported low income (a monthly income of less than SR 5000, [1 S.R. = 0.27 U.S. Dollar]) accounted for 33.2% of the sample, while this income group accounted for 34% in the general Saudi population. Middle income

participants (SR 5000 – 15000) represented 53.9 % of the sample, while this income group accounted for 55.5% in the general public. High income group (> SR 15000) in the sample accounted for 10.2% which closely matches the 10.5% in the general Saudi population (Alriyadh Information Center, 2010).

Self-perceived health status (SPHS) has become an important indicator of health in national health surveys in many countries (OECD, 2013). It is a single item asking the person to rate his/her general health. The response categories include: poor, fair, good, very good, and excellent. Mounting evidence has shown SPHS as a strong predictor of mortality (Mossey, et al., 1982; Tamayo-Fonseca, et al., 2013), health services utilization (Pu, et al., 2013), and healthcare costs (DeSalvo, et al., 2009; Perrin, et al., 2011).

In the current study, 25.5% of participants reported excellent health, while 8.7% reported poor health. The reported general health status of study participants appears to be worse than the reported health status from other population-based surveys in other countries. For example, in the United States, 35.5% of people reported excellent health, while 2.2% reported poor health, based on the 2103 National Health Interview Survey (CDC, 2013). In the European countries, a modified health categories are used to assess SPSH. Those include: very bad, bad, fair, good, very good. In general, people in the United Kingdom rated their health higher than those in the U.S. and Saudi Arabia. Percentage of people in the U.K. who reported very good health (best health category) was 38.4%, while 2.0% of people reported very bad health, based on the international health survey of the statistical office of the European Union (Eurostat, 2013).

Quality of Primary Care

Following Donabedian's model of healthcare quality assessment, primary care can be assessed using structure, process, and/or outcome measures (Donabedian, 1980). However, quality assessment in primary care may need to take a more holistic approach. Primary care is distinct from other levels of the healthcare system in its holistic view of patients, focusing on the person as a whole and not on specific disease or dysfunction. As the first contact with the healthcare system, people present to primary care with wide array of health issues and undifferentiated diagnoses. Therefore, it is important for primary care providers to not only understand the person's health complaints but to also pay attention to the living circumstances, life style, and social conditions that may determine the person's health behavior and health. This comprehensive care requires patient and family-centered primary care and a continuous, high quality patient-doctor relationship. Therefore, a more complete quality assessment of primary care will need to include process measures of interpersonal and relational aspects of primary care.

In the context of the person-focused and family and community-oriented primary care, the quality of care may optimally be assessed using measures of patient centeredness and family and community orientation. These measures go beyond the common and purely clinical and technical measures of quality. Measures of patient experience of care have gained increased international attention and are becoming standard indicators for quality in many countries' healthcare systems (Roland, et al., 2009; The US Center for Medicare and Medicaid Services, 2012). The instrument used in the current study is a multi-dimensional measure of patients' experience with primary care, which operationalizes the IOM definition of primary care. The instrument captures the performance of primary care providers from the patient-perspective in a number of

quality domains including accessibility of care, continuity of care, comprehensiveness of care, coordination of care, interpersonal treatment, communication, and community orientation. These primary care core domains have been linked to improved health outcomes and therefore, validated and reliable measures of them can be used as quality indicators for primary care (Starfield, 1998).

Domains of Primary Care

Overall, the study findings suggest that there may not be a dominant practice type. Each primary care system has its strengths and weaknesses. Primary care providers in the current study varied significantly in their performance on four of the seven quality domains, with EPC performing better in interpersonal aspects of care (interpersonal treatment and quality of communication) and CPC performing better in structural aspects of care (Accessibility and community orientation). This is consistent with previous evidence that different types of practice may have different strengths (Campbell, et al., 2001b). This study assessed quality of care in sixty general practices in England. Outcome measures included rates of preventive care, access to care, and interpersonal care. The study found that indicators for quality of care varied substantially across practices with no single type of practice having a monopoly on high quality care.

The EPC system showed better performance in interpersonal treatment (69.65 vs. 61.60, respectively; $d= 0.36$), quality of communication (70.65 vs. 65.71, respectively; $d= 0.22$), and total quality score (60.41 vs. 56.11, respectively; $d= 0.31$). These findings may suggest that EPC providers pay more attention to the quality of doctor-patient relationship and interactions as compared to CPC providers, which may explain the EPC system scoring higher in the total primary care performance.

On the other hand, the advantage of the CPC system was its better organizational access (67.30 vs. 63.34 points, respectively; $d=0.23$) and community orientation (46.92 vs. 34.34 points, respectively; $d= 0.50$). These results support the fact that the Saudi government is making an effort to expand the CPC system (the largest primary care provider in the country) to improve accessibility and availability of primary care in each community. Also CPC providers are located within communities throughout the country and are community-oriented by design, which may explain their better performance in community orientation domain as compared with EPC providers. The finding that community-based model of primary care may perform better than other models in the orientation to the community is consistent with previous evidence. A Canadian study compared performance on community orientation between three primary care models, fee-for-service family practices, health service organization, and community health centers (CHC). Their findings show significantly higher community orientation scores for CHCs as compared to other models of primary care such as fee-for-service family practices, health service organizations, and family health networks (Muldoon, et al., 2010). Similar findings were reported in Brazil with family health centers providing better community health services than traditional health services such as health posts, health centers, and hospital-based ambulatory clinics (Macinko, et al., 2007). This study assessed the primary care performance of the reformed family health centers and compared it to the performance of traditional health centers using the Primary Care Assessment Tool. Each reformed health center has a health care team composed of a physician, a nurse, and a community health agent. The reformed health centers outperformed traditional health centers in six of the eight primary care dimensions.

However, when the national provider of primary care, the CPC system, is underperforming in the interpersonal and relational aspects of care, this may undermine national efforts to improve national primary care and overall health outcomes. This topic will be addressed in more details in the policy implications section.

Comparing two different primary care systems within the same geographical area may be useful to identify strengths and weaknesses and improve the overall quality of care in the country. However, it may be useful as well to compare performance with other international healthcare systems. The available evidence shows that performance scores for both the CPC and EPC system may be well below the desired level of performance and there is still room for improvement. For example, accessibility scores in this study were lower than those found in other similar studies in other countries. A study that measured patient experience with primary care in five commercial health plans and Medicaid in the United States found that the average accessibility score was 77.6, with Medicaid scoring slightly higher than commercial plans (77.9 ± 0.4 vs. 77.5 ± 0.4) (Safran, et al., 2006). Another study surveyed patients in nine primary care trusts in England and reported an average score of 63.4 ± 0.2 for access to care (Salisbury, et al., 2010). Finally, a study in South Korea reported an accessibility score of 75.0 ± 0.9 in public health center clinics and an average score of 80.0 ± 1.5 in teaching hospital clinics (Sung, et al., 2010). As international benchmarks, these higher performance scores suggest that primary care system in Saudi Arabia still has more room for improvement in the accessibility domain.

The role of effective primary care goes beyond providing optimal care for its user population to reach out to the community to address the community's health needs, to

recognize the socioeconomic context of health and disease, and to engage the community members in the process of improving health services delivery. Although CPC performed better than EPC providers in aspects of community orientation, our results indicate that both systems' performances on community orientation were among the lowest scoring domains of primary care in the current study. This pattern is also found in other international studies, for example, in Taiwan (Tsai, et al., 2010), Hong Kong (Wong, et al., 2010), and South Korea (Sung, et al., 2010). Therefore, efforts need to be made nationally and internationally to address this problem and find ways to improve the orientation of primary care systems to the community and the population.

Optimal health outcomes require the attention to health behaviors. The quality of doctor-patient relationship is an important predictor of patient adherence to healthy life styles and behaviors (Fiore, et al., 2008; Sturmberg, 2006) and to the receipt of recommended preventive care (DiMatteo, 1994; Parchman, et al., 2004). Our findings show that there are significant variations in performance on both communication and interpersonal treatment dimensions, with performance favoring EPC over CPC system. These findings are consistent with previous studies that showed significant variations between different types of primary care providers in terms of their quality of doctor-patient relationship and interactions. A study that compared patients' experience between the traditional fee-for service (FFS) Medicare system and Medicare HMOs in the U.S. (Safran, et al., 2002) found significant performance differences in the communication quality and interpersonal treatment scales, with performance favoring the FFS Medicare over Medicare HMOs (79.8 vs. 76.4, $d = 0.17$ in communication and 76.5 vs. 72.7, $d = 0.19$ in interpersonal treatment, respectively). However, another U.S. study (Elliott, et al., 2011) did not find significant differences in the quality of communication between

Medicare Advantage and FFS Medicare systems (89.3 vs. 89.2, respectively). These international findings also indicate that both EPC and CPC systems in Saudi Arabia provide suboptimal quality of interpersonal care and communication and have more work to do to improve their performance on these important domains of primary care.

Continuity of care is another important dimension of primary care. The patient-doctor relationship and the longitudinal continuity of that relationship are unique attributes of primary care. Continuity of care (defined as the ongoing relationship between an individual doctor and the patient) contributes to improved health outcomes mainly through its significant association with improved preventive care (Saultz, et al., 2005; Starfield, et al., 2005). Furthermore, continuity of care is an important determinant of effective care especially for conditions that require regular contact with primary care providers including chronic diseases, mental health, and women and child health (World Health Organization, 2008b).

Therefore, it is important to assess how primary care providers perform on the continuity domain in order to identify opportunities for improvement. In the current study, the EPC system scored 61.66 on continuity of care, not significantly higher than the CPC system which scored 57.98 ($d = 0.16$). The CPC system may have more room and need to improve its performance on continuity of care. However, in general, scores of both systems remain below scores reported in other international studies. A U.S. study that measured primary care experiences of Medicare beneficiaries in thirteen states (using the same instrument of the current study) reported an average score of 88.3 in the continuity domain (Montgomery, et al., 2004). Two other U.S. studies reported similar range of performance for continuity of care, with average scores of 80.8 (Safran, et al.,

2006) and 84.0 (Rodriguez, et al., 2008). These findings clearly suggest that CPC and EPC primary care systems provide suboptimal level of care continuity, which may negatively influence the quality and outcomes of primary care in Saudi Arabia.

Comprehensiveness of care is another important dimension of primary care. In the current study, comprehensiveness was measured by rates of preventive counseling (smoking, diet, and physical activity) that were discussed as reported by patients. The practice of discussing these topics with patients was recommended by the US Preventive Services Task Force (U.S. Preventive Services Task Force, 2014). Our findings show that EPC and CPC systems scored very low in the preventive counseling domain (27.07 and 20.57 respectively). In fact, it was the lowest score among all domains of primary care in the current study. In addition to that, results reported here were much lower than those reported in other international studies. For example, a U.S. study reported an overall average score of 64.2 ± 0.6 for preventive counseling, with commercial health plans scoring 63.6 ± 0.6 and Medicaid system scoring 73.9 ± 2.6 (Safran, et al., 2006). A South Korean study reported a score range of 56.0 to 75.0 for comprehensiveness of care (Sung, et al., 2010). One reason for such poor preventive care performance by EPC and CPC providers may be the lack of national standards and guidelines for recommended preventive care.

Factors Associated with Patient Experience of Care

This study has identified several patient-level and organizational-level factors associated with patients' experience with care. Organizational-level characteristics that were associated with patient experience include practice type and proportions of family physicians in the center. This extends previous evidence that measures of patients'

experience varies by practice type (Lyrtatzopoulos, et al., 2011; Paddison, et al., 2012; Pineault, et al., 2011; Russell, et al., 2010; Solomon, et al., 2002).

Variability in patients' experience measures between primary care centers in the current study was significantly explained by the type of practice. In addition, magnitude of variations on patients' experience may vary differently across different levels of the healthcare system. A study that examined variations in patients' experience found that most of the variation was accounted for by individual physicians and practice sites, with health plans accounting for negligible variation (Safran, et al., 2006). Another study examined the extent to which performance variation on patients' experience is attributable to various organizational units. The study conducted multi-level regressions to account for the clustering effects at each level. Findings showed that individual physicians and their practice sites accounted for largest proportion of explainable variance and accordingly suggest that physicians and their care sites are the most important foci for patient experience improvement efforts (Rodriguez, et al., 2009a). Additionally, another study using multi-level analysis found that measures of patient experience discriminate more effectively between practices than do measures of general satisfaction of care (Salisbury, et al., 2010). This latter finding was confirmed in the current study. A separate composite scale measured patient satisfaction. By comparison, measures of patient experience showed more between-centers variability (i.e., more discriminative ability) than measures of patient satisfaction. Most of the variability of patient satisfaction was found between patients (within-centers variability) rather than between providers.

The discriminative ability of the measure of patient experience among different primary care providers and practices makes it a good performance indicator for

measuring and improving performance of primary care. As national efforts in Saudi Arabia are continuing to strengthen primary care, considerations need to be given to incorporate patient experience as an indicator for performance monitoring and improvement. Caution, however, needs to be given when using patient experience indices to compare, judge or reward performance without the appropriate case-mix adjustment. This topic is discussed in detail in a later section.

In addition to practice type, the presence of family physicians in the practice has emerged as an important associate of patients' experience. Clinics with higher proportions of family physicians may provide better patients' experience than clinics with fewer or no family physicians. This finding is consistent with previous evidence. A study found that organizational factors that explained CHCs' better performance in comprehensiveness of care include having more family physicians and having diverse allied health providers (Russell, et al., 2010).

The current study, however, does not allow for comparing the performance of specific physicians and their specialties. So, for example, we cannot say that family physicians performed better than general practitioners on measures of patient experience. The favorable performance of practices with family physicians may be related to better whole-person orientation and interpersonal skills in which family physicians are more trained. The EPC system in Saudi Arabia employs more family physicians than the CPC system and this may partially explain the EPC performance advantage, especially in interpersonal aspects of care. Family physicians are board certified and are more trained to provide patient and family-centered care than do general practitioners. In addition, family physicians in Saudi Arabia receive higher salaries than do general practitioners. Higher pay and job status may provide more incentives for family physicians to provide

better care as compared to the less-paid general practitioners. In order to foster a culture of innovation and excellence in primary care, issues of work environment and compensation levels for primary care providers need to be studied and addressed by policy makers in Saudi Arabia. Another important policy option may include training primary care physicians in the CPC system in relationship-building skills and therapeutic communication skills with patients and their families, which may go far in improving the quality and outcomes in the nation's main primary care provider (Gomez, et al., 2013; Parekh, 2011).

Our findings also showed that other organizational factors including practice size and utilization rate were not associated with performance on patient experience. However, the evidence in this regard is mixed. A study that examined patient experience with access to primary care in England found that practice size was a strong predictor of patient experience. Small practices provided better and easier access to patients than large practices (Kontopantelis, et al., 2010). The study also found that small patient list size (population size) was associated with better access experience. These findings are consistent with other study that showed a positive association between small practice size and accessibility and continuity of care (Campbell, et al., 2001a). This positive association may be explained by the finding that practices with fewer patients per doctor provided faster access and longer consultation durations (Campbell, et al., 2001a; Campbell, et al., 2001b; Kontopantelis, et al., 2010).

Other studies reported better quality of care in large practices, especially when this association is mediated by stronger clinical support systems and commitment to quality improvement in larger practices (Battista, et al., 1990; Goldzweig, et al., 2004; Yano, et al., 2007). However, it is worth noting that these studies were limited to the

assessment of clinical aspects of quality (rates of preventive screening) and did not take into account the quality and continuity of patient-doctor relationship. The potential benefits of relational and person-focused aspects of care may be overlooked in the quest of highly integrated and computerized systems of care.

Different practice arrangements may have differing impacts on the quality of care. For example, one study found that smaller practices performed better than larger ones in access to care, but for the quality of diabetic care, larger practices performed better than smaller ones (Campbell, et al., 2001b). This finding highlights the importance of taking a holistic approach to the measurement and improvement of healthcare providers' performance. Quality of care assessment is not limited to views of health professionals alone but extends to include patients interactions and experiences with the health system.

The Importance of Risk Adjustment

Measures of patient experience are gaining prominence and are used increasingly to measure, compare, reward, and improve performance of healthcare systems in many parts of the world (Luxford, 2010; Rodriguez, et al., 2009b; Roland, et al., 2009; Tourigny, et al., 2010). However, if indicators of patient experience are to be used for high stakes purposes (e.g., pay-for-performance or accreditation), then it is important to examine and adjust for patient characteristics that influence scores of patient experience above and beyond the control of healthcare providers. Case-mix adjustors, as one variety of risk adjustment in health services research, are also called "confounders" in epidemiological terminology. Case-mix adjustment is most needed when certain patient characteristics vary substantially between healthcare providers and are strongly related to the performance measure of interest. What case-mix adjustment simply does is facilitate

fair performance comparison among healthcare providers by estimating the scores providers would have received if serving the same population (Johnson, et al., 2010). Failing to make the appropriate performance adjustment may lead to penalizing providers (such as CPCs in Saudi Arabia and CHCs in the United States) who serve larger proportions of disadvantaged population. A more severe unintended consequence is when providers choose to stop seeing sicker and poorer patients to improve their performance scores and maximize their financial rewards.

In the current study, for example, unadjusted performance scores showed superior performance for the EPC system over the CPC system in all domains of primary care except community orientation. When we adjusted for those significant differences in patients characteristics across the two systems, EPC system was only superior in two domains in addition to the total performance score. The adjustment also showed better performance of the CPC system in the accessibility domain in addition to the community orientation domain.

In the current study, several patient characteristics were associated with patient experience and therefore were included in the case-mix adjustment. Those include, gender, self-perceived health status (SPHS), and patient-reported co-morbidity. Female patients, patients with poor perceived health status, and patients with more chronic conditions were each negatively associated with patient experience. On the other hand, age, income, education, and employment were not associated with patient experience in the current study.

The evidence about the significance and direction of the relationship between patient characteristics and patient experience is mixed. For example, while age was not a predictor of patient experience in the present study, a national study in England reported

age to have a relatively strong relationship with patient experience, with older patients reporting better experience with care (Paddison, et al., 2012). The study also found a strong direct association between SPHS and reported experience. As SPHS gets worse, scores of patient experience decrease. However, the study found a small influence of gender on patient experience. The same study showed that case-mix adjustment improved performance scores for primary care practices serving minorities, disadvantaged populations, and those with poorer health status. Those same practices received poor performance based on previous unadjusted patient experience measures, which would have been unfair judgment of their performance.

Another study concluded that important associations of patient experience include general health status and educational attainment and, to a lesser degree, age. The study found that SPHS mediated much of the effect of age on reports of patient experience. The study recommended the adjustment for these characteristics to ensure equitable comparison of CHCs performance on patient experience measures (Johnson, et al., 2010). In this study, younger, sicker, and more educated groups tend to report worse patient experience with care. Similar patterns of relationships were also reported in other studies (Elliott, et al., 2011; Eselius, et al., 2008; Kim, et al., 2005; O'Malley, et al., 2005a).

Overall, SPHS appeared to be the strongest and most consistent predictor of patient experience. Other patient characteristics such as gender, education, race/ethnicity, and income were less frequently reported as predictors of patient experience. More interestingly, few studies examined the association of patient-reported co-morbid conditions with measures of patient experience. In the current study, patient-reported co-morbidity emerged as a significant predictor of patient experience. This relationship

remained significant even after controlling for other important patient-level and organizational-level predictors, and taking into account the clustering effect by means of multi-level analysis.

In conclusion, the relative importance of case-mix adjustors may vary between different contexts and with different populations. The selection of case-mix adjustors need to be examined individually for each case. In testing and adjusting for differences in the case mix with measures of patient experience, multi-level analysis may be the analytical method of choice, if there is evidence of clustering effect in the data (Damman, et al., 2009; Lyratzopoulos, et al., 2011). Finally, there should be consideration given to important disparities in care experience, which may be removed by case-mix adjustment. In other words, there is a risk that case-mix adjustments could potentially “mask” poor quality of care provided to some patient subgroups (Paddison, et al., 2012). In order to avoid this consequence, there should be separate investigations focusing on identifying disparities in care, reporting quality measures stratified by, for example, socioeconomic status, and findings way to improve care experience and outcomes for vulnerable patients (Elliott, et al., 2011).

Policy Implications and Future Directions for Healthcare System in Saudi Arabia

The study has several policy implications for health services systems in Saudi Arabia. One major finding that has emerged from the study is the importance of the relationship-centered approach to healthcare. This important topic warrants special attention in the following section.

Relationship-oriented Systems of Care

Relationship-centered care (RCC) is a philosophical and clinical approach that recognizes the nature and quality of relationships as central to health care delivery systems (Suchman, 2006). Mary Beach and Tom Inui articulated four principles of RCC (Beach, et al., 2006): 1) “relationships in healthcare ought to include the personhood of patients and clinicians”, 2) “affect and emotion are important components of relationships in healthcare”, 3) “all health care relationships occur in the context of reciprocal influence”, and 4) “the formation and maintenance of genuine relationships in health care is morally valuable.”

In the ever-evolving healthcare environment and the increasing professional and governmental regulations and oversights, healthcare organizations may lose sight of the most integral part of systems of care, the patient-doctor relationship. This, in turn, may result in negative consequences for patients’ health and for the effectiveness of the health system. A weak patient-doctor relationship has been associated with poor patient care experience and negative health outcomes (Hinchey, et al., 2011; Jackson, et al., 1999), while an enduring, high quality relationship between doctors and their patients is linked with improved patient experience, treatment adherence, and health outcomes (Gomez, et al., 2013; Parekh, 2011).

While health information technology is becoming increasingly essential for medical diagnosis and treatment, interpersonal communication remains the primary tool by which patient and physician exchange information (Branch, 2014; Ong, et al., 1995). The quality of information exchanged and subsequent health benefits depend on the level of trust, familiarity, and quality of relationship between the patient and the physician

(Parekh, 2011). Such therapeutic relationship has been characterized to be “connexional”, “transpersonal”, and “spiritual” (Suchman, et al., 1988). The word “connexional” indicates a mutual experience of joining and the feeling of wholeness. “Transpersonal” suggests going beyond the boundaries of one’s self to join with the other. While “spiritual” means transcending the material aspects of relationship to connect with the mind and soul. These qualities of social interactions and connections can help healthcare providers shape new meaning of the human experience of health and illness and contribute to a more holistic approach of the healing process (Beckman, et al., 2012).

The relationship-centered model of care holds promise to the Saudi healthcare system and is closely aligned with the strategic plans and future directions for health services system in the country. The Ministry of Health and in its latest publication of the 10-year (2010-2020) strategic plan for health services has used “patient first” as its title (Ministry of Health, 2010b). The strategic plan acknowledged that the patient is the corner stone of the health system and its highest priority. Moreover, the strategy stated that the health system needs to be reformed so it will become a system in which 1) the needs of the patient and the community are recognized, 2) the needed health services are easier to access and to obtain, 3) the patient is provided with sufficient time with the doctor to be listened to and to receive full explanation of his/her condition and management plan, 4) care is coordinated and easier to navigate, and 5) healthcare services are provided with respect of patient’s dignity and rights.

The strategic health plan has indicated that primary healthcare system will continue to be the main delivery system of comprehensiveness preventive and curative

health services to the entire population. There are plans to expand the primary care system in terms of its organizational access and the type of health services it will provide. The document has also recognized the need to move from a hospital-centered system to a community-based system in order to improve the efficiency and effectiveness of the health system.

These future directions of health system reform in Saudi Arabia fit the goals and objectives of the current study. As the Saudi healthcare system moves in these directions, this becomes an opportunity to adapt the patient-centered primary care model advocated in the study. This model of care is based on strong and ongoing patient-doctor relationship, is oriented toward the family and the community, and is focused on health promotion and disease prevention.

It may, however, prove difficult to successfully implement a relationship-centered care approach in the current healthcare model. Unfortunately, the biomedical model of clinical medicine leaves little room to foster such therapeutic relationships and interactions. In the current medical education system, physicians may be well-trained in making diagnosis and prescribing drugs and other treatments, but may lack the interpersonal skills that allow them to connect therapeutically with their patients.

To enable physicians and other healthcare providers to provide relationship-centered care, Saudi Arabia healthcare system may need to move away from the traditional biomedical model and adapt the biopsychosocial model of health, which, in addition to considering biological factors, recognizes and addresses the social and psychological dimensions of health and human experience (Borrell-Carrio, et al., 2004). There is a growing body of evidence showing that patient's social and cultural

environments influence the likelihood that a patient will engage in health-promoting or treatment behaviors such as an eating healthy diet, engaging in physical activity, or adhering to medication regimens (DiMatteo, et al., 2007). Therefore, it is essential to broaden the conceptual framework of healthcare to recognize the wider perspective of contextual influences on health including social, cultural, and economic conditions that may determine health and health behaviors of patients and populations (Alder, 2008; Marmot, et al., 2006).

However, changing the conceptual framework and orientation of the health system is not easy. Such a large-scale change will likely encounter resistance from within and outside the healthcare system. Therefore, it may be useful to allow for a gradual implementation of the new model. For example, the Ministry of Health may carry out pilot implementation projects in selected healthcare organizations to test the interventions and evaluate the outcomes of the biopsychosocial approach. The implementation can then be taken to a larger scale.

A national policy may be needed to support the exploration of innovative models of delivery and management in health system. The policy will create the medium for the diffusion of innovative models and testing pilot programs that show promise for improving the performance and outcomes of the health system. The Ministry of Health can benefit in this regard from the Center for Medicare and Medicaid Innovation efforts in the United States. The center supports the development and testing of innovative health care payment and service delivery models such as the Community-based Wellness and Prevention Programs, the Patient-Centered Medical Homes, and the Accountable Care Organizations (Center for Medicare and Medicaid Services, 2011).

Accountable Care Organizations (ACOs) are provider-based organizations that take responsibility for meeting the health care needs of a defined population with the goal of simultaneously improving health, improving patient experience and reducing per capita costs. Among the guiding principles of ACOs, which also typify the conceptual framework of the current study, are: strong primary care providers who deliver comprehensiveness, coordinated, and patient-centered care, and commitment to improve quality and patient experience through continuous monitoring and analysis of routinely collected quality of care and patient experience measures (American College of Physicians, 2010).

Another example of innovative models comes from Austria National Health Care System (Fazekas, et al., 2012). Numerous studies have shown successful implementation of the biopsychosocial model in the Austrian healthcare system (Fazekas, et al., 2009; Langewitz, et al., 2010). Results from these studies show positive effects of these programs including a significant increase in patient-centered communication by physicians and significant clinical improvements in different aspects of patients' psychosocial health.

The Ministry of Health may also need to design and implement continuing medical education programs to teach and train its employed physicians using the principles and theory of the biopsychosocial approach. The desired outcomes of these training programs would include graduating physicians who understand the importance of the psychosocial context of health and are competent in interpersonal skills and relationship-building aspects of patient care. Other objectives should include improving population-based knowledge and skills of healthcare professionals using insight from

theories of social determinants of health. There should also be similar training programs for nurses and other healthcare professionals.

In addition to reforming clinical practice, concepts and theories of biopsychosocial model and social determinant of health should also be integrated in the medical education and other health sciences programs. Graduating new healthcare professionals with strong population health knowledge as well as therapeutic psychosocial and interpersonal skills should become among the top strategic goals of Saudi Arabia health policy.

Measuring and Improving Patient experience

The study is an effort to raise the awareness and direct the attention of policy makers, healthcare system leaders, and health systems researchers toward the importance of patient-centered care and the feasibility of measuring and improving patient-reported quality of primary care. The study advocates integrating the imperatives of quality and relationship-centered care into the current health policy strategies that aim to expand the availability of and access to preventive and curative health services to the entire population.

Because of the important role community-based primary care plays in serving the essential health needs of disproportionately disadvantaged population, assuring access to high quality community-based primary health care services may have a great potential not only to improve health outcomes but also to reduce disparities in healthcare (Lyrtzopoulos, et al., 2012; Shi, et al., 2005a).

The study advocates putting patients in the driver seat when it comes to evaluating the quality of care they receive. Peoples' voices not only needs to be heard but also need to be integrated as an important component of quality assessment and improvement especially at the primary care system level. Therefore, the study recommends establishing a system of quality assessment and improvement that uses a bottom-up approach that is patient, family, and community-oriented in order to complement the existing top-down application of evidence-based medical practice guidelines.

Additionally, the study is an attempt to pave the way to use measures of patient experience to monitor and improve quality and outcomes of primary care in Saudi Arabia. Patient experience surveys have recently gained increased recognition among healthcare professionals, researchers, and policy makers and have been proposed as a promising alternative measure of patient-reported quality of care. The survey asks patients to report their experiences in areas that research has shown to be of value to patients and are linked to important patient outcomes. Those areas include accessibility of care, continuity of care, coordination of care, interpersonal treatment, and communication (Kringos, et al., 2010; Starfield, 1998).

The study provides a translated, validated evidence-based patient experience measure that can be used by the Ministry of Health and other primary care providers in the Kingdom. Saudi Arabia may benefit from international experiences in using patient experience measures in evaluating and improving performance of healthcare providers. For example, the Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey is the most widely used national, evidence-based survey for assessing patient

experience of care in the United States (Cleary, et al., 2012). There are different forms of CAHPS survey that are used for different types of healthcare providers including hospitals (H-CAHPS) and Clinicians and Groups (CG-CAHPS). Many of the patient experience survey items and domains in CAHPS survey are similar to those found in the PCAS survey used in the current study. As a matter of fact, the clinicians and groups version of CAHPS survey was developed based on items of the PCAS among other instruments (Solomon, et al., 2005). However, PCAS is developed specifically for primary care to measure all core attributes underlying high quality primary care. PCAS is therefore longer and more specific to primary care than CAHPS survey.

Similar to results found in the current study, CG-CAHPS survey demonstrated strong reliability properties and discriminated well between differing medical providers, making it a reliable measure of providers' performance on measures of patients' experience (Dyer, et al., 2012; Solomon, et al., 2005). Results from CAHPS surveys in the U.S. are currently used in public reporting (Martino, et al., 2013), accreditation purposes (Scholle, et al., 2012), quality improvement efforts (Schlesinger, et al., 2012), and pay for performance schemes (Centers for Medicare & Medicaid Services, 2014). However, it is still early to assess the impact of integrating measures of patient experience as a national measure of healthcare performance on quality and outcomes of care.

In order to understand the policy implications of using measures of patient experience in the U.S., Saudi Arabia, and worldwide, future research projects should be directed to serve three main policy objectives: 1) to identify best practices for the standardization of the measurement and reporting of measures of patient experience, 2) to assess the impact of using measures of patient experience on performance and outcomes

of healthcare organizations, and 3) to assess and address issues of inequalities in quality of care and patient experience of care. Measures of patient experience may shed more light not only on the overall quality of patient experience but also on hidden and unjustifiable poor care quality provided to minorities and socially disadvantaged groups. These are important policy issues that may not be detected by traditional measures of healthcare quality.

In Saudi Arabia, the use of patient experience measures can be implemented in a gradual basis. For example, implementation can begin with low-stakes applications of patient experience measures (internal monitoring) before moving to higher stakes purposes (e.g., pay for performance) (Browne, et al., 2010). Healthcare providers may begin using the Arabic PCAS in self-monitoring and evaluation of patient-reported quality on a regular basis (for example, every 3 months) to monitor trend over time and to see if patient experience is improving or declining and intervene accordingly to correct areas of deficiency. The Ministry of Health can hire experts in health services research to provide professional and technical support to help providers apply best practices and scientifically sound methods of collecting, analyzing, and reporting data on patients' experience with care and services. Results of patient experience can also be reported (voluntarily first, then mandatory next) to the Ministry of Health to be considered in planning quality improvement programs. Public reporting on measures of patient experience can also be used to inform consumer choice and to motivate quality improvement initiatives.

Once initial implementations of measuring patient experience are successful, a more advanced program of pay for performance can be implemented. The Ministry of

Health finances primary care services through annual budget transfer to local directorates of health that oversee primary care centers. As a part of the annual budget, the ministry can incorporate a financial reward or penalty tied to performance on patient experience with primary care. Pay for performance based on patient experience measures has been implemented in the United States with marked success (Rodriguez, et al., 2009b). This study examined the relationship between performance-based financial incentives and performance on patient experience of primary care using data from 124,021 patient visits to 1,444 primary care physicians in 25 medical groups in California between 2003 and 2006. The study showed significant improvements in physicians' performance on patient experience of primary care. More specifically, there was an increase of 0.62 annual points in physician-patient communication, an increase of 0.48 annual points in care coordination, and an increase of 0.22 annual points in office staff interaction. Furthermore, physicians with lower baseline performance on patient experience measures experienced greater performance improvements.

Study Strengths and Weaknesses

This is the first multi-level study measuring patient experience of primary care in Saudi Arabia. In addition, this is the first study to compare primary care performance in two different primary care systems in the Kingdom, and to adapt an international standard for primary care. However, there are several limitations to this study that warrant considerations. First, this was a subjective assessment of primary care quality based on patient-reported quality. Patients' reports and evaluations are influenced by many personal and contextual factors that fall outside the purview of primary care and therefore may confound the relationship between explanatory variables and outcome variables. However, measures of patient experience are designed to elicit reports from patients

about specific aspects of their care experience. Therefore, it may be less influenced by individuals' value judgment as compared to the traditional measures of patient satisfaction of care (Salisbury, et al., 2010). Nonetheless, as an attempt to minimize the confounding effect, the study measured and controlled for possible confounders such as individuals' sociodemographic characteristics, health status, health services utilization, and health behaviors. A primary care quality assessment that does not adjust for the characteristics of target population is incomplete. However, over adjusting for these characteristics may blur the analysis and overlook important explanatory socioeconomic factors that influence health and health seeking behaviors.

Second, data collected from patients using survey method is subject to many types of bias. One type is the social desirability bias. This takes place when patients tend to respond favorably to the survey especially in face-to-face interviews, by either over-reporting "good behavior" or under-reporting "bad behavior", which introduces bias to the results. Additionally, patients may skip questions or give arbitrary answers when questions are ambiguous, they do not have enough information about the situation (technical aspects of quality), or questions that are too private such as those regarding personal income or health behaviors. The study attempted to minimize the effect of these sources of bias in several ways. First, the presence of the investigator at the time of completing the survey in both face-to-face interviews and self-completed surveys helped clarify or explain to the participant any ambiguous questions, which can further improve the response accuracy. Secondly, the anonymity of the survey subjects was emphasized (participants were not be asked to provide their names or national IDs or any other identifiers) and confidentiality was assured to encourage patients to respond freely and not worrying about any negative repercussions. Thirdly, PCAS measures areas that the

patients are the best source of information as reflected by their experience with care. On the other hand, the PCAS does not ask patients to judge technical aspects of quality which are beyond patients' knowledge and expertise, thereby enhancing the reliability of the survey and improving the validity of the results.

Third, patient surveys tend to suffer low response rate and therefore affecting the overall validity of the study. This is especially the case in mail and phone surveys. The present study attempted to mitigate the low response bias by conducting the survey in waiting areas. Evidence has shown the improved response rate of surveys completed in waiting areas. Compared to mail and telephone surveys, waiting room surveys have proven to yield a higher response rate (Dahrouge, et al., 2009; Hogg, et al., 2010). The response rate of the current study was 84.5%, which is considered a very good response rate. In addition to improved response rate, having the patients complete the survey in the same environment they are being surveyed about can enhance the response quality (Dahrouge, et al., 2009; Hogg, et al., 2010).

Finally, the PCAS is not a visit-specific measure. The PCAS measures primary care domains in the context of the clinician-patient relationship. The strength of the PCAS comes from its ability to measure primary care performance using a multidimensional approach that reflects the breadth of primary care practice with a special attention to the quality of patient-provider relationship and the continuity of that relationship.

Conclusion

Primary healthcare has gained increased worldwide attention as an important component for efficient, effective, and integrated healthcare systems that can contribute

to improved health and health equity while reducing healthcare costs (Kringos, et al., 2010; Starfield, et al., 2005). International health organizations such as the World Health Organization have proposed primary healthcare strategy as the main vehicle to achieve the “health for all” goal.

Saudi Arabia, among other nations, has adopted the primary healthcare approach to achieve health for all. With mostly socialized healthcare system, the Kingdom has made considerable progress in expanding access to primary care and strengthening the organizational capacities of the primary care system. However, while expanding access to primary care is essential, assuring the quality of primary care is equally if not more important to improve the effectiveness and efficiency the healthcare system .

The purpose of this study was to assess the quality of primary care as elicited from patients’ experience with care and to explore factors influencing patients’ experience of primary care. Patient-centered care is proposed as an increasingly important component of quality of care, especially at the primary care level. The study used a combination of the Donabedian model of quality of care and the Starfield primary care quality model as the theoretical frameworks of the study. In addition, the Institute of Medicine multidimensional definition of primary care and its core attributes were used as the guiding conceptual framework for the study.

The literature and practices of quality of care have mostly focused on clinical (technical) aspects of care such as evidence-based standards, professional competencies, and objective indicators of quality. While these are important, little attention has been given to interpersonal and relational aspects of care. Primary care, by its nature, is holistic and person-focused. Any quality assessment at the primary care level that fails to consider the quality and continuity of patient-doctor relationship is incomplete. The

present study is an attempt to fill this gap in literature with respect to relationship-centered care model and patient experience with primary care.

The current study is an effort to establish a baseline assessment of quality of public healthcare in Saudi Arabia from the patient perspective using a scientifically sound conceptual framework and a valid and reliable instrument of quality measurement based on patient experience with care. Measures of patient experience are shown to be valid and reliable and have good discriminative ability and therefore can be used to measure and improve primary care performance. This baseline assessment of primary care system performance may inform subsequent larger scale research efforts that address systemic challenges facing the public healthcare system in its stride to meet the essential healthcare needs of individuals, families, and communities in Saudi Arabia.

Case-mix adjustment should be considered in performance measurement of patient experience in order to facilitate fair judgment on performance and increase the face validity and acceptance of performance monitoring among healthcare providers. However, if case-mix adjustment is to be implemented, there should be other strategies in place to address healthcare disparities that may otherwise be masked by case-mix adjustment. For instance, separate investigations can identify disparities in care experience and report quality measures stratified by, for example, socioeconomic position.

Along with social and economic determinants of health, access and quality of primary care are important contributing factors to health (Starfield, 1998; World Health Organization, 2008b). A high-performing primary care system is, thus, a critical strategy for the assurance of an accessible, equitable, efficient, effective, and integrated healthcare

system which, as part of the larger public health system, can contribute to improved population health and health equity in Saudi Arabia.

From a policy perspective, study's findings provide valuable information for primary care providers and policy makers who seek to evaluate and improve primary care performance on patient experience. The study proposes a paradigm shift in Saudi Arabia healthcare system to address the biopsychosocial factors of health and illness. To improve people's health and wellbeing, a community-based and population-oriented healthcare system need to be at the top of health policy agenda. In this regard, the author advocates the use of positive indicators of health at both the individual and community levels, which can include measures of quality of life, patient experience, interpersonal and relational aspects of care, and positive changes in health behaviors such as adopting healthy life styles. Those kinds of health indicators can foster a culture of positive health and well-being and may serve to re-orient existing healthcare systems from a sole focus on sickness and disease, to include additional approaches for prevention and wellness at the societal level.

The ministry of health in Saudi Arabia provides comprehensive preventive and curative health services to the entire population. Improvement in the quality of public healthcare services, even a small one, can have a positive impact on the health of the public. Most importantly, because the ministry of health oversees both the public health system and the primary care system, this creates a great opportunity to align community-oriented primary care services with the existing programs and functions of the public health systems. This model of integration of national health services and systems is needed to achieve the overall goal of improving and protecting population health.

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Primary Care Assessment Survey

(The adapted version with permission from the author)



The Health Institute
New England Medical Center

Administrative Information (To be filled by the investigator only)

Center number: _____

Organizational Setting:

_____ Community-based

_____ Employer-based

Case number: _____

_____ **Self-administered**

_____ **Interviewer-administered**

Center's Regular Office Hours:

___ One shift (8 AM-4 PM)

___ Two shifts

___ Thursday AM

___ After hours on-call

Practice Size: _____ total primary care physicians per center

_____ General Physicians

_____ Family Physicians

Average Utilization Rate: _____ patient visits per day

Population Size: _____ patients per center

INSTRUCTIONS

For each question, circle one answer & or write in your answer _____ on the line provided.

There are no wrong answers.

Please answer every question based on your experience with this primary care center (unless you are asked to skip questions because they don't apply).

If you find a question too private or personal, you can skip it and answer the other questions. In any case, your answers are completely confidential and will never be shared with anyone.

If you have questions, please do not hesitate to ask the researcher present at the center, or call 0536905942.

When you are finished, please return the survey to the researcher at the center.

Thank you for participating.

YOUR PRIMARY CARE CENTER

1. How **long** have you been going to this primary care center?

π
Less than
6 months

[1]

π
Between
6 months and
1 year

[2]

π
1 to 2
years

[3]

π
3 to 5
years

[4]

π
More than
5 years

[5]

2. In the last 12 months, how many times did you visit this center to get care for yourself?

π 1 times

π 2 times

π 3 times

π 4 times

π 5 or more times

3. Would you **recommend** this primary care center to your family and friends?

π
Definitely yes
[1]

π
Probably yes
[2]

π
Not sure
[3]

π
Probably not
[4]

π
Definitely not
[5]

CONTINUE

4a. How many **minutes** does it usually take you to get to your primary care center?

- [1] π Less than 15
- [2] π 16 to 30
- [3] π 31 to 60
- [4] π More than 60

b. How would you rate the convenience of your primary care center's **location**?

- | | | | | | |
|-----------|-------|-------|-------|-----------|-----------|
| π | π | π | π | π | π |
| Very poor | Poor | Fair | Good | Very good | Excellent |
| [1] | [2] | [3] | [4] | [5] | [6] |

5a. What **additional** hours would you like your primary care center to be open? (fill in all that apply)

- [1] π Early morning
- [2] π Evenings
- [3] π Weekends
- [4] π None, I am satisfied with the hours

b. How would you rate the **hours** that your primary care center is open for medical appointments?

- | | | | | | |
|-----------|-------|-------|-------|-----------|-----------|
| π | π | π | π | π | π |
| Very poor | Poor | Fair | Good | Very good | Excellent |
| [1] | [2] | [3] | [4] | [5] | [6] |

6a. When you are **sick** and call the primary care center for an appointment, how quickly do they usually **see** you?

- [1] π The same day
- [2] π The next day
- [3] π In 2 to 3 days
- [4] π In 4 to 5 days
- [5] π In more than 5 days

b. How would you rate the usual **wait** for an appointment when you are sick and call the primary care center asking **to be seen**?

- | | | | | | |
|-----------|-------|-------|-------|-----------|-----------|
| π | π | π | π | π | π |
| Very poor | Poor | Fair | Good | Very good | Excellent |
| [1] | [2] | [3] | [4] | [5] | [6] |

CONTINUE

7a. How many minutes **late** do your appointments at your primary care center usually begin?

- [1] π None, they begin on time
- [2] π Less than 5 minutes late
- [3] π 6 to 10 minutes late
- [4] π 11 to 20 minutes late
- [5] π 21 to 30 minutes late
- [6] π 31 to 45 minutes late
- [7] π More than 45 minutes late



b. How would you rate the amount of time you **wait** at your primary care center for your appointment to **start**?

- π Very poor [1]
- π Poor [2]
- π Fair [3]
- π Good [4]
- π Very good [5]
- π Excellent [6]

8. Thinking about the times you have needed to **see or talk to** your doctor, how would you rate the following:

a. Ability to **get through to** the primary care center by phone?

- π Very poor [1]
- π Poor [2]
- π Fair [3]
- π Good [4]
- π Very good [5]
- π Excellent [6]

a. Ability to **speak to your doctor** by phone when you have a question or need medical advice?

- π Very poor [1]
- π Poor [2]
- π Fair [3]
- π Good [4]
- π Very good [5]
- π Excellent [6]

CONTINUE

YOUR REGULAR PRIMARY CARE DOCTOR

Thinking about **your regular doctor** that you usually see in this primary care center, please answer the following questions:

9. Do you know **the name** of your regular doctor?

[1] Yes	[2] No
------------	-----------

10. How **long** has this person been your regular doctor?

π Less than 6 months	π Between 6 months and 1 year	π 1 to 2 years	π 3 to 5 years	π More than 5 years
[1]	[2]	[3]	[4]	[5]

11a. When you go for a **check-up or routine care**, how often do you see your **regular doctor** (not an assistant or partner)? →

π Always	π Almost Always	π A lot of the time	π Some of the time	π Almost never	π Never
[1]	[2]	[3]	[4]	[5]	[6]

b. How would you rate this? →

π Very poor	π Poor	π Fair	π Good	π Very good	π Excellent
[1]	[2]	[3]	[4]	[5]	[6]

12a. When you are **sick** and go to the doctor, how often do you see your **regular doctor** (not an assistant or partner)? →

π Always	π Almost Always	π A lot of the time	π Some of the time	π Almost never	π Never
[1]	[2]	[3]	[4]	[5]	[6]

b. How would you rate this? →

π Very poor	π Poor	π Fair	π Good	π Very good	π Excellent
[1]	[2]	[3]	[4]	[5]	[6]

CONTINUE

13. Thinking about **talking** with your regular doctor, how would you rate the following:

	[1]	[2]	[3]	[4]	[5]	[6]
	Very poor	Poor	Fair	Good	Very good	Excellent
a. Thoroughness of your doctor's questions about your symptoms and how you are feeling	π	π	π	π	π	π
b. Attention your doctor gives to what you have to say	π	π	π	π	π	π
c. Doctor's explanations of your health problems or treatments that you need	π	π	π	π	π	π
d. Doctor's instructions about symptoms to report and when to seek further care	π	π	π	π	π	π
e. Doctor's advice and help in making decisions about your care	π	π	π	π	π	π

14. How often do you leave your doctor's office with **unanswered questions**?

π	π	π	π	π	π
Always	Almost always	A lot of the time	Some of the time	Almost never	Never
[1]	[2]	[3]	[4]	[5]	[6]

15. Thinking about the **personal aspects** of the care you receive from your regular doctor, how would you rate the following:

	[1]	[2]	[3]	[4]	[5]	[6]
	Very poor	Poor	Fair	Good	Very good	Excellent
a. Amount of time your doctor spends with you	π	π	π	π	π	π
b. Doctor's patience with your questions or worries	π	π	π	π	π	π
c. Doctor's friendliness and warmth toward you	π	π	π	π	π	π
d. Doctor's caring and concern for you	π	π	π	π	π	π
e. Doctor's respect for you	π	π	π	π	π	π

CONTINUE

16. Which of the following has your regular doctor **ever** talked to you about?

(answer each line)	[1] Yes, in the last 3 years	[2] Yes, more than 3 years ago	[3] Yes, I don't remember when	[4] No
a. Smoking	π	π	π	π
b. Seat belt use	π	π	π	π
c. Diet	π	π	π	π
d. Exercise	π	π	π	π
e. Stress	π	π	π	π

17. Has your doctor ever recommended that you see a **different doctor** for a specific health problem?

[1] Yes	[2] No	
π	π	→ GO TO QUESTION 19 ON NEXT PAGE

18. Thinking about the times your doctor has recommended you see a **different doctor** for a specific health problem, how would you rate the following:

	[1] Very poor	[2] Poor	[3] Fair	[4] Good	[5] Very good	[6] Excellent
a. Help your regular doctor gave you in deciding who to see for specialty care	π	π	π	π	π	π
b. Help your regular doctor gave you in getting an appointment for specialty care you needed	π	π	π	π	π	π
c. Regular doctor's communication with specialists or other doctors who saw you	π	π	π	π	π	π
d. Help your regular doctor gave you in understanding what the specialist or other doctor said about you	π	π	π	π	π	π

CONTINUE

19. All things considered, how **satisfied** are you with your **regular doctor**?

- ^[1] Completely satisfied, couldn't be better
 - ^[2] Very satisfied
 - ^[3] Somewhat satisfied
 - ^[4] Neither satisfied nor dissatisfied
 - ^[5] Somewhat dissatisfied
 - ^[6] Very dissatisfied
 - ^[7] Completely dissatisfied, couldn't be worse
-

20. All things considered, how **satisfied** are you with your **primary care center**?

- ^[1] Completely satisfied, couldn't be better
- ^[2] Very satisfied
- ^[3] Somewhat satisfied
- ^[4] Neither satisfied nor dissatisfied
- ^[5] Somewhat dissatisfied
- ^[6] Very dissatisfied
- ^[7] Completely dissatisfied, couldn't be worse

BACKGROUND INFORMATION

21. How old are you? _____ **years** old

22. Are you male or female?

π	π
Male	Female
[1]	[2]

23. How many people **live in** your household, including yourself, other adults, and any children?

_____ **people**

24. What is **the total monthly income** of your household in Saudi Riyals?

π	π	π	π	π
Less than	3,000 to	5,001 to	10,001 to	More than
3,000	5,000	10,000	15,000	15,000
[1]	[2]	[3]	[4]	[5]

25. What is your **current** marital status?

π	π	π	π	π
Married	Separated	Divorced	Widowed	Never been married
[1]	[2]	[3]	[4]	[5]

26. What is the **highest grade** you completed in school?

π	π	π	π	π	π
Elementary or less	Intermediate	High School	2-year diploma	Bachelor degree	Postgraduate degree
[1]	[2]	[3]	[4]	[5]	[6]

CONTINUE

27. How would you describe your **cigarette** smoking habits?

^[1] Never smoked π	^[2] Used to smoke π	^[3] Now smoke π
--	---	---

→ b. How many cigarettes a day do you smoke?
_____ cigarettes per day

28. How often do you **buckle your safety belt** when driving?

π None of the time ^[1]	π A little of the time ^[2]	π Some of the time ^[3]	π Most of the time ^[4]	π All of the time ^[5]
--	--	--	--	---

29. How many times per week do you **exercise** for 20 minutes or more (for example, take a brisk walk)?

_____ times per week

30. Thinking about the **amount of stress** in your life, would you say that most days are:

π Extremely stressful ^[1]	π Quite stressful ^[2]	π A bit stressful ^[3]	π Not very stressful ^[4]	π Not at all stressful ^[5]
---	---	---	--	--

31. How **tall** are you? _____ centimeters.

32. How much do you **weigh**? _____ kilograms.

CONTINUE

YOUR HEALTH

33. In general, would you say your health is:

π Excellent [1]	π Very good [2]	π Good [3]	π Fair [4]	π Poor [5]
-----------------------	-----------------------	------------------	------------------	------------------

	[1] Yes	[2] No
34. Has a doctor ever told you that you had:		
a. Hypertension or high blood pressure	π	π
b. A heart attack in the last year (myocardial infarction)	π	π
c. Congestive heart failure (heart failure or enlarged heart)	π	π
d. Diabetes (high blood sugar)	π	π
e. Angina (An-JI-na or AN-jin-na)	π	π
f. Cancer	π	π
g. Asthma, emphysema, or Chronic Obstructive Pulmonary Disease	π	π
h. Rheumatoid Arthritis or Osteoarthritis	π	π
i. Depression	π	π
j. Migraine headaches	π	π

THANK YOU FOR COMPLETING THIS SURVEY!

APPENDIX B: The Primary Care Assessment Survey- Arabic

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Primary Care Assessment Survey

إستبيان تقييم الرعاية الصحية الأولية

Administrative Information (To be filled by the investigator only)

Center number: _____

Organizational Setting:

_____ Community-based

_____ Employer-based

Case number: _____

_____ Self-administered

_____ Interviewer-administered

Center's Regular Office Hours:

___ One shift (8 AM-4 PM)

___ Two shifts

___ Thursday AM

___ After hours on-call

Practice Size: _____ total primary care physicians per center:

_____ General Physicians

_____ Family Physicians

Average Utilization Rate: _____ patient visits per day

Population Size: _____ patients per center

التعليمات

هذا إستبيان عن جودة الرعاية الصحية التي تلقيتها في المركز الصحي.
الرجاء المشاركة وتعبئة هذا الإستبيان.
مشاركتك مهمة لتحسين جودة الخدمة ورضا المريض في المركز الصحي.
الرجاء أشر بدائرة ○ حول الإجابة المناسبة لك.
الرجاء الإجابة على جميع الأسئلة بدقة.
في بعض الحالات سيتم توجيهك بعلامة ← للذهاب للسؤال المناسب لك.
لن يتم سؤالك عن إسمك أو أي معلومة عن هويتك.
سيتم الحفاظ على أجوبتك بسرية تامة ولن تُعطى لأي شخص بتاتاً.
إذا كان لديك أي أسئلة، رجاءً لا تتردد في سؤال الباحث.
كُتِبَ الإستبيان بصيغة المذكر، لكنّه موجّه أيضاً للإناث.

شكراً لك على المشاركة

فيما يخص المركز الصحي

١- منذ متى وأنت تذهب لهذا المركز الصحي؟

منذ أقل من ٦ أشهر [١]
بين ٦ أشهر و سنة [٢]
من سنة إلى سنتين [٣]
من ٣ إلى ٤ سنوات [٤]
منذ ٥ سنوات أو أكثر [٥]

٢- خلال ال ١٢ شهر الماضية، كم مرّة زرت هذا المركز الصحي للحصول على رعاية صحيّة تخصّك أنت من الطبيب العام أو طبيب العائلة؟ (لا تحسب زيارات طبيب الأسنان).

- مرّة واحدة
- مرتين
- ٣ مرّات
- ٤ مرّات
- ٥ مرّات فأكثر

٣- هل تنصح أصدقاءك وأقربائك بزيارة هذا المركز الصحي؟

نعم بالتأكيد [١]
تقريباً نعم [٢]
غير متأكد [٣]
تقريباً لا [٤]
بالتأكيد لا [٥]

الأسئلة التالية تتعلق بالرعاية الصحية التي تلقيتها في المركز الصحي

<p>(ب) - كيف تقيّم سهولة الوصول للمركز الصحي؟</p> <p>ممتاز [٦] جيد جداً [٥] جيد [٤] معقول [٣] سيء [٢] سيء جداً [١]</p>	<p>٤ (أ) - كم يستغرق وصولك إلى المركز الصحي؟</p> <p>[١] أقل من ١٥ دقيقة [٢] من ١٦ إلى ٣٠ دقيقة [٣] من ٣١ إلى ٦٠ دقيقة [٤] أكثر من ٦٠ دقيقة</p>
---	--

<p>(ب) - كيف تقيّم ساعات الدوام الحالية للمركز الصحي؟</p> <p>ممتازة [٦] جيدة جداً [٥] جيدة [٤] معقولة [٣] سيئة [٢] سيئة جداً [١]</p>	<p>٥ (أ) - ما هي ساعات الدوام التي تفضل أن يفتح فيها المركز الصحي؟ (يمكن إختيار أكثر من خيار)</p> <p>[١] فترة واحدة من ٨ صباحاً إلى ٤ عصرًا [٢] فترتين صباحية ومساءلية [٣] فترة دوام صباحية ليوم الخميس [٤] فترة مناوبة بعد ساعات الدوام الرسمية</p>
---	--

<p>(ب) - كيف تقيّم المدة التي تفصل بين وقت طلبك للموعد ووقت الموعد الذي حصلت عليه؟</p> <p>ممتازة [٦] جيدة جداً [٥] جيدة [٤] معقولة [٣] سيئة [٢] سيئة جداً [١]</p>	<p>٦ (أ) - عندما تكون مريضًا وتطلب موعدًا لزيارة الطبيب في المركز الصحي ،متى تحصل على الموعد؟</p> <p>[١] في نفس اليوم [٢] في اليوم التالي [٣] بعد يومين أو ثلاثة [٤] بعد ٤ أيام أو أكثر</p>
--	---

<p>(ب) - كيف تقيّم المدة التي تمضيها بانتظار بداية الزيارة؟</p> <p>ممتازة [٦] جيدة جداً [٥] جيدة [٤] معقولة [٣] سيئة [٢] سيئة جداً [١]</p>	<p>٧ (أ) - عند وصولك للمركز الصحي في موعدك المحدد، كم من الوقت تنتظر عادةً قبل بدأ الزيارة؟</p> <p>[١] في الموعد المحدد بدون تأخير [٢] أقل من ١٠ دقائق [٣] من ١٠ إلى ٢٠ دقيقة [٤] من ٢١ إلى ٣٠ دقيقة [٥] من ٣١ إلى ٤٠ دقيقة [٦] من ٤١ إلى ٦٠ دقيقة [٧] أكثر من ٦٠ دقيقة</p>
---	---

٨- عندما كنت بحاجة للإتصال هاتفياً بالمركز الصحي، كيف تقيّم ما يلي:

أ. إمكانية الإتصال بالمركز الصحي هاتفياً:

ممتازة	جيدة جداً	جيدة	معقولة	سيئة	سيئة جداً	لم أحتاج / غير ممكن
[٦]	[٥]	[٤]	[٣]	[٢]	[١]	[٩٩]

ب. إمكانية الحديث هاتفياً مع طبيبك عندما يكون لديك سؤال أو إستشارة طبيّة:

ممتازة	جيدة جداً	جيدة	معقولة	سيئة	سيئة جداً	لم أحتاج / غير ممكن
[٦]	[٥]	[٤]	[٣]	[٢]	[١]	[٩٩]

فيما يخص طبيبك المعتاد (الطبيب العام أو طبيب العائلة)

بالفكر في طبيبك المعتاد (العام) الذي تراه عادةً عند زيارتك للمركز الصحي، أحب على مايلي:

٩- هل تعرف إسم طبيبك المعتاد؟

[١] نعم [٢] لا

١٠- منذ متى وهذا الشخص هو طبيبك المعتاد؟

منذ أقل من ٦ أشهر	بين ٦ أشهر و سنة	من سنة إلى سنتين	من ٢ إلى ٤ سنوات	منذ ٥ سنوات أو أكثر
[١]	[٢]	[٣]	[٤]	[٥]

١١ (أ)- عندما تذهب لمناوبة طبيبة روتينية، كم مرة ترى طبيبك المعتاد (وليس أي طبيب بديل أو مناوب آخر)؟					
سوء جداً [١]	سوء [٢]	معقول [٣]	جيد [٤]	جيد جداً [٥]	ممتاز [٦]
[١] دائماً [٢] تقريباً دائماً [٣] في أغلب الأحيان [٤] في بعض الأحيان [٥] نادراً [٦] أبداً					
١٢ (أ)- عندما تكون مريضاً وتذهب للمركز الصحي، كم مرة ترى طبيبك المعتاد (وليس أي طبيب بديل أو مناوب آخر)؟					
سوء جداً [١]	سوء [٢]	معقول [٣]	جيد [٤]	جيد جداً [٥]	ممتاز [٦]
[١] دائماً [٢] تقريباً دائماً [٣] في أغلب الأحيان [٤] في بعض الأحيان [٥] نادراً [٦] أبداً					

١٣- فيما يخص نقاشك وحديثك مع طبيبك المعتاد، كيف تقيّم ما يلي؟

(ضع دائرة حول الرقم المناسب أمام كل فقرة)

سوء جداً [١]	سوء [٢]	معقول [٣]	جيد [٤]	جيد جداً [٥]	ممتاز [٦]	أ. شمولية أسئلة الطبيب عن الأعراض الموجودة لديك وعن ما تشعر به
سوء جداً [١]	سوء [٢]	معقول [٣]	جيد [٤]	جيد جداً [٥]	ممتاز [٦]	ب. إصغاء وانتباه الطبيب لما تقول
سوء جداً [١]	سوء [٢]	معقول [٣]	جيد [٤]	جيد جداً [٥]	ممتاز [٦]	ت. شرح الطبيب لك عن مشاكلك الصحية والعلاج المطلوب
سوء جداً [١]	سوء [٢]	معقول [٣]	جيد [٤]	جيد جداً [٥]	ممتاز [٦]	ث. تعليمات الطبيب بخصوص الإبلاغ عن الأعراض والحصول على الرعاية
سوء جداً [١]	سوء [٢]	معقول [٣]	جيد [٤]	جيد جداً [٥]	ممتاز [٦]	ج. نصائح الطبيب ومساعدته لك لإتخاذ القرارات حول رعايتك

١٤- كم مرة حدثت وغادرت عيادة الطبيب وما زالت لديك أسئلة لم يُجاب عليها؟

دائماً [١]	تقريباً دائماً [٢]	في أغلب الأحيان [٣]	في بعض الأحيان [٤]	نادراً [٥]	أبداً [٦]
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١٥- فيما يخص تعامل الطبيب معك خلال تقديم الرعاية الصحية لك ، كيف تقيّم ما يلي ؟

ممتاز	جيد جداً	جيد	معقول	سيء	سيء جداً	
(٦)	(٥)	(٤)	(٣)	(٢)	(١)	أ. طول الوقت الذي يمضيه الطبيب معك
(٦)	(٥)	(٤)	(٣)	(٢)	(١)	ب. صبر الطبيب بما يتعلق بأسئلتك ومخاوفك
(٦)	(٥)	(٤)	(٣)	(٢)	(١)	ت. الود والدفء اللذان يظهرهما الطبيب لك
(٦)	(٥)	(٤)	(٣)	(٢)	(١)	ث. مدى عناية و إهتمام الطبيب بك
(٦)	(٥)	(٤)	(٣)	(٢)	(١)	ج. مدى إحترام الطبيب لك

١٦- هل مرّةً تحدث إليك طبيبك المعتاد عن الأمور التالية؟

لا أبداً	نعم، لكن لا أتذكر متى	نعم، منذ أكثر من ٣ سنوات	نعم خلال ال ٢ سنوات الأخيرة	
(٤)	(٣)	(٢)	(١)	أ. التدخين
(٤)	(٣)	(٢)	(١)	ب. إستخدام حزام الأمان
(٤)	(٣)	(٢)	(١)	ج. التغذية
(٤)	(٣)	(٢)	(١)	د. ممارسة الرياضة
(٤)	(٣)	(٢)	(١)	هـ. الإجهاد (الضغط النفسي)

١٧- هل قام طبيبك بتحويلك من المركز الصحي إلى طبيب مختص من أجل علاج مشكلة صحية معينة؟

[١] نعم [٢] لا ← إذهب إلى السؤال ١٩

١٨- بالتفكير في المرات التي قام طبيبك بتحويلك إلى طبيب آخر لعلاج مشكلة صحية معينة، كيف تقيم ما يلي؟

ممتازة	جيدة جداً	جيدة	معقولة	سيئة	سيئة جداً	
(٦)	(٥)	(٤)	(٣)	(٢)	(١)	أ. المساعدة التي قدمها لك طبيبك المعتاد لإختيار الطبيب المختص الذي تم تحويلك إليه
(٦)	(٥)	(٤)	(٣)	(٢)	(١)	ب. المساعدة التي قدمها لك طبيبك المعتاد لتحديد موعد عند الطبيب المختص
(٦)	(٥)	(٤)	(٣)	(٢)	(١)	ت. التواصل بين طبيبك المعتاد وبين الأطباء المختصين أو الأطباء الآخرين الذين قامو بعلاجك
(٦)	(٥)	(٤)	(٣)	(٢)	(١)	ث. المساعدة التي قدمها لك طبيبك المعتاد من أجل فهم ما قاله عنك الطبيب المختص أو طبيب آخر

١٩- فيما يخص علاقة المركز الصحي بالمجتمع، أجب على مايلي:

بالتأكيد لا	تقريباً لا	غير متأكد	تقريباً نعم	نعم بالتأكيد	
(٥)	(٤)	(٣)	(٢)	(١)	أ. هل يقوم المركز الصحي بعمل زيارات منزلية في الحي؟
(٥)	(٤)	(٣)	(٢)	(١)	ب. هل يعرف المركز الصحي عن المشاكل الصحية الهامة في مجتمع الحي؟
(٥)	(٤)	(٣)	(٢)	(١)	ج. هل يتقبل المركز الصحي آراء وأفكار سكان الحي من أجل تقديم رعاية صحية أفضل؟

٢٠- بأخذ كلّ شئ في الإعتبار، ما هو مدى رضاك عن طبيبك المعتاد؟

- [١]- راضي جدًا - لا أتخيّل وضعًا أفضل من هذا
- [٢]- راضي جدًا
- [٣]- راضي
- [٤]- محايد
- [٥]- غير راضي
- [٦]- غير راضي بالمرّة
- [٧]- غير راضي بالمرّة - لا أتخيّل وضعًا أسوأ من هذا

٢١- بأخذ كلّ شئ في الإعتبار، ما هو مدى رضاك عن هذا المركز الصحي؟

- [١]- راضي جدًا - لا أتخيّل وضعًا أفضل من هذا
- [٢]- راضي جدًا
- [٣]- راضي
- [٤]- محايد
- [٥]- غير راضي
- [٦]- غير راضي بالمرّة
- [٧]- غير راضي بالمرّة - لا أتخيّل وضعًا أسوأ من هذا

أكمل في الصفحة التالية.....

معلومات عن صحتك

٢٢- بشكلٍ عام ، هل تقول أن صحتك:

ممتازة [١]	جيدة جدًا [٢]	جيدة [٣]	مقبولة [٤]	سيئة [٥]
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٢٣- هل قد أخبرك الطبيب بأن لديك أحد الأمراض التالية: (أجب بنعم أو لا عن كل مرض)

	[١]	[٢]
	لا	نعم
أ. ضغط الدم المرتفع	<input type="checkbox"/>	<input type="checkbox"/>
ب. ذبحة صدرية أو مرض شرايين القلب	<input type="checkbox"/>	<input type="checkbox"/>
ج. قصور القلب (تضخم القلب)	<input type="checkbox"/>	<input type="checkbox"/>
د. نوبة قلبية	<input type="checkbox"/>	<input type="checkbox"/>
هـ. جلطة دماغية	<input type="checkbox"/>	<input type="checkbox"/>
و. السكر	<input type="checkbox"/>	<input type="checkbox"/>
ز. الربو أو النفاخ الرئوي أو أي مشكلة رئوية مزمنة	<input type="checkbox"/>	<input type="checkbox"/>
ح. التهاب المفاصل أو هشاشة العظام أو الروماتيزم	<input type="checkbox"/>	<input type="checkbox"/>
ط. السرطان	<input type="checkbox"/>	<input type="checkbox"/>
ي. إكتئاب	<input type="checkbox"/>	<input type="checkbox"/>
ك. حُرقة مزمنة أو تقرحات المعدة	<input type="checkbox"/>	<input type="checkbox"/>
ل. آلام مزمنة في الظهر أو عرق النسا	<input type="checkbox"/>	<input type="checkbox"/>

معلومات مهمة

٢٤- كم عمرك؟ _____ سنة.

٢٥- ماهو جنسك؟

ذكر [١]
أنثى [٢]

٢٦- الحالة الوظيفية:

موظف [١] موظف متقاعد [٢] غير موظف [٣] غير ذلك (وضح): _____ [٤]

٢٧- ما هي أعلى مرحلة دراسية حصلت عليها؟

الإبتدائية أو أقل [١] المتوسطة [٢] الثانوية العامة [٣] الدبلوم [٤] البكالوريوس [٥] دراسات عليا [٦]

٢٨- ماهو دخل الأسرة الشهري (مجموع راتبك ورواتب الذين يعيشون معك في المنزل، بالريال السعودي)؟

أقل من ٣,٠٠٠ [١] ٣,٠٠٠ إلى ٥,٠٠٠ [٢] ٥,٠٠٠ إلى ١٠,٠٠٠ [٣] ١٠,٠٠٠ إلى ١٥,٠٠٠ [٤] أكثر من ١٥,٠٠٠ [٥]

٢٩- هل تمارس عادة التدخين؟

لا لم أدخن أبداً [١] كنت مدخناً وأقلعت [٢] نعم أنا مدخن حالياً [٣] ← كم سيجارة تدخن يومياً؟
 _____ سيجارة يومياً

٣٠- كم عدد المرات التي تمارس فيها الرياضة؟ (مثل رياضة المشي، كرة القدم، السباحة).

يوميًا [١] معظم أيام الأسبوع [٢] بعض أيام الأسبوع [٣] مرة أو مرتين في الشهر [٤] نادراً [٥]

٣١- بالتفكير في مقدار الإجهاد (الضغط النفسي) في حياتك ، هل تقول أنك معظم الأيام:

مُجهّد إلى أبعد الحدود [١] مُجهّد تماماً [٢] مُجهّد بعض الشيء [٣] لست مُجهّداً جداً [٤] لست مُجهّداً أبداً [٥]

شكراً جزيلاً لك على المشاركة في هذا الإستبيان

APPENDIX C: Approval from the University of Louisville's Institutional Review Board



INSTITUTIONAL REVIEW BOARDS

University of Louisville
MedCenter One, Suite 200
501 E. Broadway
Louisville, Kentucky 40202-1798
Office: 502-852-5188
Fax: 502-852-2164

To: Esterhay, Robert
From: The University of Louisville Institutional Review Board (IRB)
Date: Wednesday, May 30, 2012
Subject: Approval Letter

Tracking #: 12.0248
Title: Patient-Reported Quality of Primary Care in Saudi Arabia
Approval Date: 5/23/2012 12:00:00 AM
Expiration Date: 5/22/2013 12:00:00 AM

This study was reviewed on 05/23/2012 by the chair/vice chair of the Institutional Review Board and approved through the Expedited Review Procedure, according to 45 CFR 46.110(b), since this study falls under Expedited Category (7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

This study was also approved through 45 CFR 46.117(c), which means that an IRB may waive the requirement for the investigator to obtain a signed informed consent form for some or all subjects if it finds either:

- ° That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or
- ° That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

The following items have been approved:

- Dissertation Proposal, April 2012

- Subject Informed Consent in Arabic
- Subject Informed Consent
- Verification of Translation

This study now has final IRB approval from 05/23/2012 through 05/22/2013. You should complete and return the Progress Report/Continuation Request Form EIGHT weeks prior to this date in order to ensure that no lapse in approval occurs. The committee will be advised of this action at their next full board meeting.

Site Approval

If this study will take place at an affiliated research institution, such as Jewish Hospital/St Marys Hospital, Norton Healthcare, or University of Louisville Hospital, permission to use the site of the affiliated institution may be necessary before the research may begin. If this study will take place outside of the University of Louisville Campuses, permission from the organization should be obtained before the research may begin. Failure to obtain this permission may result in a delay in the start of your research.

Privacy & Encryption Statement

The University of Louisville's Privacy and Encryption Policy requires such information as identifiable medical and health records; credit card, bank account and other personal financial information; social security numbers; proprietary research data; dates of birth (when combined with name, address and/or phone numbers) to be encrypted. For additional information: <http://security.louisville.edu/PolStds/ISO/PS018.htm>.

1099 Information (If Applicable)

As a reminder, in compliance with University policies and Internal Revenue Service code, all payments (including checks, gift cards, and gift certificates) to research subjects must be reported to the University Controller's Office. Petty Cash payments must also be monitored by the issuing department and reported to the Controller's Office. Before issuing compensation, each research subject must complete a W-9 form.

For additional information, please contact the Controller's Office at 852-8237 or contro11@louisville.edu.

The following is a NEW link to an Instruction Sheet for BRAAN2 "How to Locate Stamped/Approved Documents in BRAAN2" if your item was submitted on or after 5/17/10:

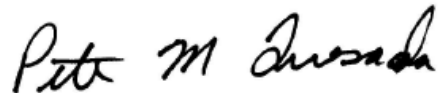
<http://louisville.edu/research/braan2/help/ApprovedDocs.pdf/view>

Please begin using your approved (stamped) document(s) at this time. The previous versions are no longer valid. If you need assistance in accessing any of the study documents, please feel free to contact our office at (502) 852-5188. You may also email our service account at hspofc@louisville.edu for assistance.

Best wishes for a successful study. If you have any questions please contact the

HSPPO at (502) 852-5188 or hsppofc@louisville.edu.

Thank you.



Board Designee: Quesada, Peter

Once you begin your human subject research the following regulations apply:

1. Unanticipated problems or serious adverse events encountered in this research study must be reported to the IRB within five (5) work days.
2. Any modifications to the study protocol or informed consent form must be reviewed and approved by the IRB prior to implementation.
3. You may not use a modified informed consent form until it has been approved and validated by the IRB.
4. Please note that the IRB operates in accordance with laws and regulations of the United States and guidance provided by the Office of Human Research Protection (OHRP), the Food and Drug Administration (FDA), the Office of Civil Rights (OCR) and other Federal and State Agencies when applicable.
5. You should complete and SUBMIT the Continuation Request Form eight weeks prior to this date in order to ensure that no lapse in approval occurs.

Letter Sent By: Block, Sherry, 5/30/2012 3:42 PM

Full Accreditation since June 2005 by the Association for the Accreditation of Human Research Protection Programs, Inc.



APPENDIX D: IRB Approval from the Ministry of Health in Saudi Arabia



KFSH-D Institutional Review Board (IRB)
National Registration Number (H-05-D-002)
Federal Wide Assurance (00018714)
IRB Number (IRB00008686)

IRB Approval Letter
24 September 2012
IRB Reference Number: MOH008-Exp99

Khalid Alahmary
PhD Candidate in Health Management
School of Public Health and Information Sciences
University of Louisville, KY, USA
khalid2237@hotmail.com

Re: Patient-Reported Quality of Primary Care. A comparative study of patients' experiences with primary care in community-based primary care centers and hospital-based primary care centers in Riyadh, Saudi Arabia.
Study Number: MOH008

Dear Mr. Khalid,

By 19 September 2012, the Institutional Review Board (IRB) of KFSH-D received Study documents for initial review. On 22 September 2012, the IRB Chairman reviewed the study documents and requested minor modifications. On 24 September 2012 updated documents were received and reviewed by the IRB Chairman. The IRB approves the study documents in versions listed below.

The protocol is approved for one year **24 September 2012 – 24 September 2013**.

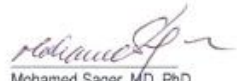
- If there are any amendments, please complete the "Amendments Submission Form" and return it to the IRB. Amendments may not be initiated until IRB approval has been obtained.
- If you need to extend the IRB Approval, please submit an application for continuation of approval to be submitted by **23 August 2013**.
- Upon study completion, we would be grateful if you could submit a final report.

If you have any further enquiries regarding the IRB's decision, you may contact the IRB Coordinator at Jamhawilo@kfsh.med.sa

Protocol	V.2 Date: June 2012
Consent form	V.2 Date: June 2012
Data Collection Sheet	V.2 Date: June 2012
Number of subjects approved for your site is	640 patients from sixteen centers.

We thank you for submitting your study for review by the IRB at KFSH-D and wish you all the best with this study.


Khalid Alkari, MD
IRB Chairman
KFSH-D


Mohamed Sager, MD, PhD
Director, Research Administration
KFSH-D

1-2

Issued by IRB Coordinator: **Lama Jamhawi, M.Sc.**
Telephone +966-3- 844 2222 Ext 6808
Email: Jamhawilo@kfsh.med.sa

مستشفى الملك سعود التخصصي بالدمام
King Fahad Specialist Hospital-Dammam



KFSH-D Institutional Review Board (IRB)
National Registration Number (H-05-D-002)
Federal Wide Assurance (00018714)
IRB Number (IRB00008686)

Conditions of Approval

1. No subjects may be included in a study procedure prior to the first patient in (FPI) as specified in the protocol. This means that nothing can be done with subjects until after the date of the FPI.
2. All unanticipated or serious adverse events must be reported to the IRB within 5 days.
3. All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk. This includes any change of investigator, or site address.
4. Inform the IRB prior to making prospective changes to the study procedures. If you know something will change, the IRB should also know.
5. All protocol deviations must be reported to the IRB within 5 working days.
6. All recruitment materials and methods must be approved by the IRB prior to being used, as these would be considered modifications.
7. If a study activity will continue after the expiration date, the sponsor and investigator(s) are responsible for initiating the Continuing Review proceedings.
8. **Site Approval**
If this study will take place outside of KFSH-D, permission from the organization should be obtained before the research may begin. Failure to obtain this permission may result in a delay in the start of your research.


Khadij Alkari, MD
IRB Chairman
KFSH-D


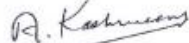



Mohamed Sager, MD, PhD
Director, Research Administration
KFSH-D

2-2

Issued by IRB Coordinator: **Lama Jamhawi, M.Sc.**
Telephone +966-3- 844 2222 **Ext.** 6808
Email: Jamhawilo@kfsk.med.sa

مستشفى الملك فهد التخصصي بالدمام
King Fahad Specialist Hospital-Dammam 

APPENDIX E: IRB Approval from the National Guard Health Affairs in Saudi Arabia

Health Affairs Executive Office 23/07/2012 14:47:51/7954/2012 Kingdom of Saudi Arabia	File # 7954/2012		المملكة العربية السعودية الحرس الوطني - الشؤون الصحية
National Guard Health Affairs	14572	1515	252-0772
Institutional Review Board	CLNResearch1@ngha.med.sa		
MEMORANDUM Ref. #: IRBC/224/12			
Date:	(G) 16 JULY 2012 (H) 26 Shaban 1433		
To:	MR. KHALID AWAD ALAHMARY Principal Investigator – RC12/029 PhD Candidate KSAU-HS, CPHHI in Riyadh & University of Louisville, KY, USA		
Subject:	PROTOCOL RC12/029 - "Patient-Reported Quality of Primary Care: A Comparative Study of Patients' Experiences with primary Care in Community-based Primary Care Centers and Hospital-based primary Care Centers in Riyadh, Saudi Arabia"		
<p>This is in reference to your subject proposal, which has been reviewed by the IRB Office on the 14th of July 2012 through the expedited review process. Upon recommendation of the Research Committee, and following the review of the IRB on the ethical aspects of the proposal, you are granted permission to conduct your study.</p> <p>Your research proposal is approved for one year commencing from the above date with the following conditions:</p> <p>TERMS OF APPROVAL:</p> <ol style="list-style-type: none">Annual Reports: Continued approval of this project is dependent on the submission of an Annual Report. Please provide KAIMRC with an Annual Report <u>determined by the date of your letter of approval.</u>Amendments to the approved project: Changes to any aspect of the project require the submission of a Request for Amendment to KAIMRC and must not begin without an approval from KAIMRC. Substantial variations may require a new application.Future correspondence: Please quote the project number and project title above in any further correspondence.Monitoring: Projects may be subject to an audit or any other form of monitoring by KAIMRC at any time.Retention and storage of data: The PI is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.			
 Prof. Amin Kashmeery Chairman, Institutional Review Board (IRB) National Guard Health Affairs	 Dr. Mohammed Al Jumah Executive Director, KAIMRC National Guard Health Affairs	 Dr. Bandar Al Knawy Chief Executive Officer National Guard Health Affairs	
AK/jue			
P.O. Box 22490, Riyadh 11426 Tel. 8011111 Telex : 403450 NGRMED SJ KFH - MATERIALS 14574 (05/96) (ORACLE 29795)	ص. ب. ٢٢٤٩٠ الرياض ١١٤٢٦ تلفون ٨٠١١١١١ تلکس ٤٠٣٤٥٠ NGHA - Printing Press 17 / 137		

APPENDIX F: IRB's Approved Subject Informed Consent-Arabic

UNIVERSITY OF LOUISVILLE
INSTITUTIONAL REVIEW BOARD
Date Approved 05/23/2012 Valid Thru
5/22/2013

الموافقة المستنيرة للمشاركة في البحث

عنوان البحث: تقييم جودة الرعاية الصحية الأولية من خلال تجربة المرضى في مدينة الرياض بالمملكة العربية السعودية

عزيزي المشارك في البحث:

أنت مدعو للمشاركة في هذا البحث من خلال الإجابة على الاستبيان المرفق عن تجربتك الشخصية مع الرعاية الصحية الأولية. يجب أن يكون عمرك ١٨ سنة فأكثر لكي تستطيع المشاركة في هذا البحث. ليس هناك أخطار معلومة مترتبة على مشاركتك في هذا البحث. قد لا تحصل على فائدة مباشرة من مشاركتك في هذا البحث ولكن المعلومات التي تتشارك بها ستسهم في تطوير مستوى الجودة في مراكز الرعاية الصحية الأولية بالمملكة. بعد إكمال الإجابة على الاستبيان، سوف يستلمه منك الباحث المتواجد في المركز الصحي. ستستغرق الإجابة على هذا الاستبيان حوالي ١٥ دقائق.

سوف يتم التعامل مع المعلومات التي تتشارك بها بسرية تامة وسوف تستخدم لإتمام هذا البحث فقط. لن يُطلب منك إعطاء معلومات تحدد هويتك للحفاظ على الخصوصية والسرية التامة.

المشاركة في هذا البحث اختيارية. بالإجابة على هذا الاستبيان فإنك توافق على المشاركة في هذا البحث. تستطيع رفض المشاركة أو الانسحاب من المشاركة في أي وقت دون أن يؤثر ذلك على أي منافع مستحقة لك.

إذا كان لديك أي أسئلة أو إستفسارات بخصوص هذا البحث، يمكنك الإتصال على الباحث الرئيسي : خالد بن عوض الأحمري على هاتف رقم : ٠٥٣٦٩٠٥٩٤٢ أو ٠٠١٥٠٢٤٢٢٦٥١.

إذا كان لديك أي إستفسار عن حقوقك كمشارك في البحث يمكنك الإتصال بمكتب أخلاقيات الأبحاث بجامعة لويفيل على الهاتف رقم ٠٠١٥٠٢٨٥٢٥١٨٨.

لقد تم مراجعة هذا البحث والموافقة عليه من قبل مجلس مراجعة الأبحاث بالجامعة.

إذا كان لديك أي شكوى بخصوص هذا البحث أو أعضاء البحث يمكنك الإتصال على الخط المباشر ٠٠١٨٧٧٨٥٢٧١٦٧ على مدى ٢٤ ساعة.

مع خالص الشكر والتقدير،
خالد عوض الأحمري

مرشح دكتوراة - قسم الإدارة الصحية وعلوم الأنظمة بكلية الصحة العامة وعلوم المعلوماتجامعة لوفيل
ولاية كنتاكي بالولايات المتحدة الأمريكية

UNIVERSITY OF LOUISVILLE
INSTITUTIONAL REVIEW BOARD
Date Approved 05/23/2012 Valid Thru 5/22/2013

APPENDIX G: IRB's Approved Subject Informed Consent-English

UNIVERSITY OF LOUISVILLE
INSTITUTIONAL REVIEW BOARD
Date Approved 05/23/2012 Valid Thru 5/22/2013

Subject Informed Consent

Title of Research Study: Patient-Reported Quality of Primary Care in Saudi Arabia

Dear Participant:

You are being invited to participate in a research study by answering the attached survey about your experience with primary care. Please note that you must be 18 years old or older to participate in this study. There are no known risks for your participation in this research study. The information collected may not benefit you directly. The information learned in this study may be helpful to others. The information you provide will help to improve the patient experience and quality of primary care in Saudi Arabia. Your completed survey will be collected by the interviewer present at the primary care center and will be placed in a locked briefcase. The survey will take approximately 15 minutes to complete.

Individuals from the Institutional Review Board (IRB), the Human Subjects Protection Program Office (HSPPO), and other regulatory agencies may inspect these records. In all other respects, however, the data will be held in confidence to the extent permitted by law. Should the data be published, your identity will not be disclosed.

Taking part in this study is voluntary. By completing this survey you agree to take part in this research study. You do not have to answer any questions that make you uncomfortable. You may choose not to take part at all. If you decide to be in this study you may stop taking part at any time. If you decide not to be in this study or if you stop taking part at any time, you will not lose any benefits for which you may qualify.

If you have any questions, concerns, or complaints about the research study, please contact: Khalid Alahmary at the phone number: 0536905942 or 001-502-422-2651.

If you have any questions about your rights as a research subject, you may call the Human Subjects Protection Program Office at 001-(502) 852-5188. You can discuss any questions about your rights as a research subject, in private, with a member of the Institutional Review Board (IRB). You may also call this number if you have other questions about the research, and you cannot reach the research staff, or want to talk to someone else. The IRB is an independent committee made up of people from the University community, staff of the institutions, as well as people from the community not connected with these institutions. The IRB has reviewed this research study.

If you have concerns or complaints about the research or research staff and you do not wish to give your name, you may call 001-877-852-1167. This is a 24 hour hot line answered by people who do not work at the University of Louisville.

Sincerely,
Khalid A. Alahmary
PhD Candidate in Health Management & Systems Sciences
School of Public Health & Information Sciences
University of Louisville

APPENDIX H: Verification of Translation for the PCAS and the Informed Consent

Kingdom of Saudi Arabia
Ministry of Higher Education
King Saud University
Code 034
College of Nursing

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك سعود
رمزها ٠٣٤
كلية التمريض

Date: التاريخ: No.: الرقم:

To whom it may concern

This is to certify that I have reviewed the Arabic translation of both the Primary Care Assessment Survey and the Subject Informed Consent form provided by Mr. Khalid A. Alahmary for his dissertation titled "Patient-Reported Quality of Primary Care in Saudi Arabia".

I certify that the Arabic translation is accurate and reflects the exact meaning conveyed in English language.

I also certify that I am a native speaker of the Arabic language and a fluent speaker of the English language.

Sincerely,

Adel S. Bashatah, PhD, RN
Assistant Professor
Vice Dean for Academic Affairs
College of Nursing
King Saud University
Office: ٤٦٩-٣٦٢٢
Fax: ٤٦٩-٣٦٢١



APPENDIX I: LIST OF ACRONYMS

ACO	Accountable Care Organization
ACSC	Ambulatory Care Sensitive Condition
CDC	Centers for Disease Control and Prevention
CPC	Community-based Primary Care
EPC	Employer-based Primary Care
HLM	Hierarchical Linear Modeling
HMO	Health Maintenance Organization
IOM	Institute of Medicine
ICC	Intraclass Correlation Coefficient
MOH	Ministry of Health
OECD	Organisation for Economic Co-operation and Development
PCAS	Primary Care Assessment Survey
PCP	Primary Care Physician
SPHS	Self-Perceived Health Status
USPSTF	United States Preventive Services Task Force
WHO	World Health Organization

Figure 3.1 Histogram of Total Quality Score (0-100)

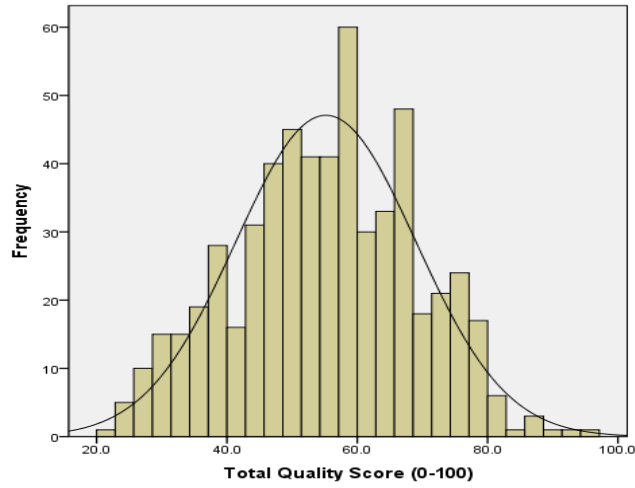


Figure 3.2 Normal Q-Q Plot of Total Quality Score (0-100)

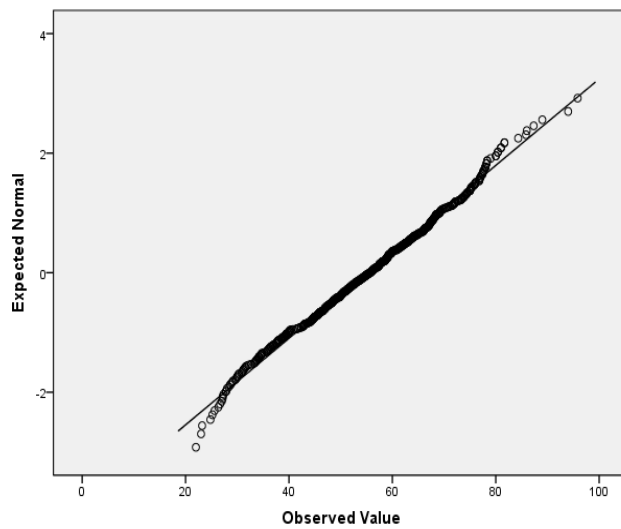


Figure 3.3 Normal P-P Plot of Residuals against Standard Normal for the Full Model

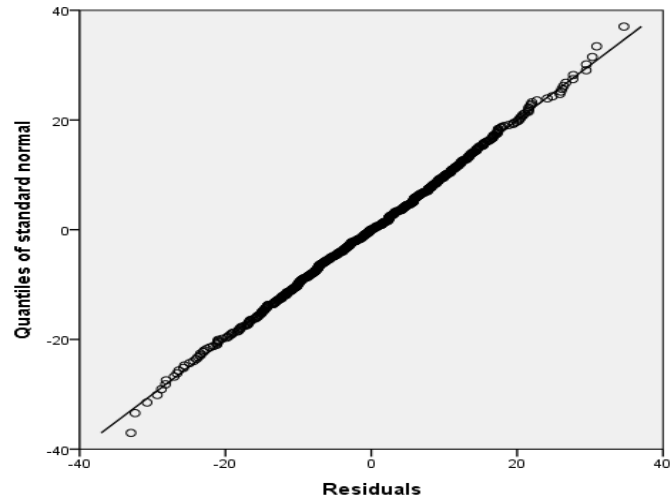


Figure 3.4 Scatterplot of Standardized Residuals against Fitted Values for the Full Model

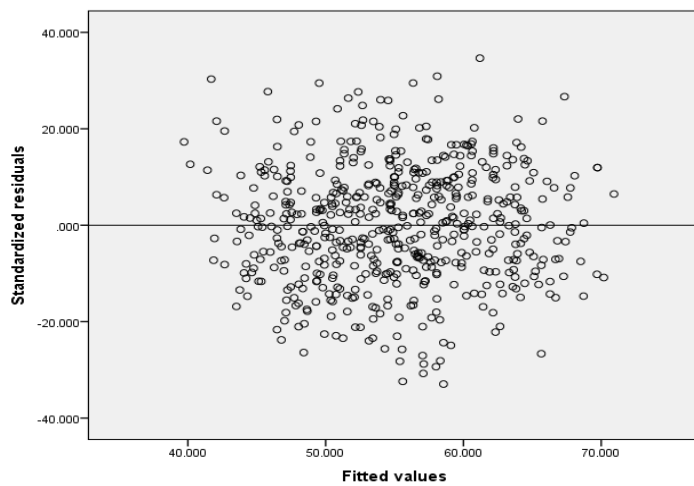


Figure 3.5 Regression Residuals for Global Satisfaction Scale (0-100)

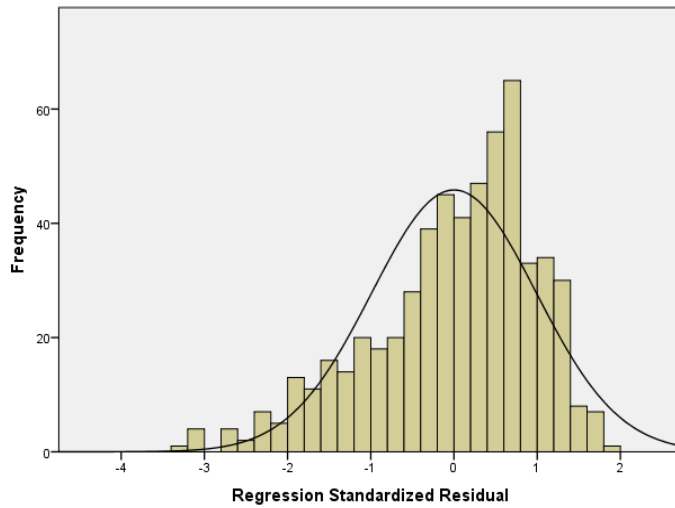
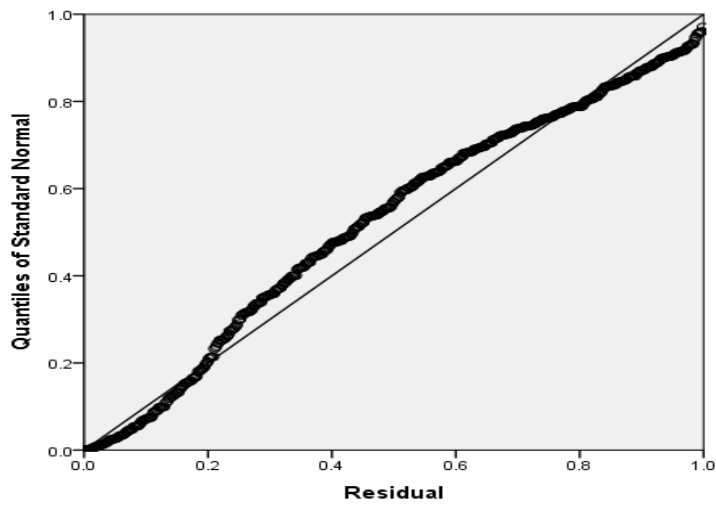


Figure 3.6 Normal P-P Plot of Residuals against Standard Normal for Global Satisfaction Scale (0-100)



CURRICULUM VITAE

NAME: Khalid Awad Alahmary

ADDRESS: Department of Health Systems and Quality Management
King Saudi bin Abdulaziz University for Health Sciences
Riyadh, Saudi Arabia

PROFESSIONAL EXPERIENCE

Lecturer
September, 2011 – present
Department of Health Systems and Quality Management
King Saudi bin Abdulaziz University for Health Sciences
Riyadh, Saudi Arabia

Intern
May – August, 2010
Department of Quality Management
Norton Healthcare
Louisville, KY

Staff Nurse I, Coronary Care Unit
2003 – 2006
King Faisal Specialist Hospital and Research Center
Riyadh, Saudi Arabia

Teaching Assistant
2000 – 2001
King Saud University
Riyadh, Saudi Arabia

EDUCATION: B.S., King Saud University, 2000
B.S.N., George Mason University, 2003
M.S.N., University of Pittsburgh, 2008
Ph.D., Public Health Sciences
University of Louisville, 2014

PROFESSIONAL
SOCIETIES:

Inducted as a member of the Golden Key International Honour Society on October 18, 2009.

Nominated for membership of the National Society of Collegiate Scholars, Fairfax, VA, USA on April 5, 2002.

Installed as a member of the Epsilon Delta Chapter of Phi Beta Delta – Honor Society of International Scholars – Fairfax, VA, USA on April 15, 2002.

Inducted into Sigma Theta Tau - International Honor Society of Nursing as a member of Epsilon Zeta Chapter at George Mason University, Fairfax, VA, USA on April 28, 2002.

NATIONAL
CONFERENCES:

Abstract accepted at the Academy Health Conference for Health Services Research.

June 8-10, 2014
San Diego, CA

Presented a poster presentation at the Public Health Services and Systems Research (PHSSR) Keeneland Conference.

April 7-10, 2014
Lexington, KY

Presentation Title: Quality of Primary Care from the Patient Perspective in Saudi Arabia: A Multi-Level Study

Presented at the E- Health Conference that was organized by KFSH & RC and broadcasted live to eight hospitals from all over the kingdom.

November 2005
Riyadh, Saudi Arabia

Presentation Title: Acute Myocardial Infarction