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Saudi Nurse Knowledge, Cultural Perspective, and Intent Regarding Cervical Cancer Prevention

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by

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Each person whose signature appears below certifies that this dissertation in his/her opinion is adequate, in scope and quality, as a dissertation for the degree Doctor of Philosophy.

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CONTENT

FIGURES

Figures Page

TABLES

Tables Page

ABBREVIATIONS

CC	Cervical Cancer
Pap test	Papanicolaou test
HPV	Human Papilloma virus
TRA	Theory of Reasoned Action

ABSTRACT OF THE DISSERTATION

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Cervical cancer can be controlled by providing screening and vaccination. Although rates for this female cancer are decreasing in developed countries, these low rates are not observed in the other countries. In Saudi Arabia, cervical cancer cases are increasing dramatically (from only 152 cases in 2014, to 241 cases in 2017). Lack of knowledge about cervical cancer prevention presumably contributes to the morbidity and mortality rate among Saudi women, as do religio-cultural beliefs about modesty, sexuality, and premarital virginity. Therefore, this study sought to describe how Saudi nurses' knowledge and religio-cultural beliefs effected their intentions to promote cervical cancer prevention.

The Theory of Reasoned Action, which posits that personal beliefs and subjective norms contribute to health behavior intentions, guided his study. A cross sectional, descriptive, mixed methods design using survey methods was employed. Data were collected in an urban hospital in Jeddah City, in the Kingdom of Saudi Arabia. All the female Saudi nurses who worked in this hospital were invited to participate in the study. The survey was comprised of quantitative scales and qualitative items that assessed the nurses' knowledge and beliefs about cervical cancer screening and HPV vaccination, religious and cultural influences to seeking healthcare, intention to provide cervical

cancer prevention, as well as demographic items. Items and scales used were obtained from previous research or developed for this study; content validity indexing and "think aloud" processes supported the validity of the survey, and Cronbach's alphas ranging from 0.52 to 0.84 for the scales lent support to the internal reliability of the instruments.

The sample included 82 nurses (response rate of 98%). Results revealed low knowledge about cervical cancer prevention; the average number of knowledge items answered correctly was 44%. Linear regression results indicated that the more knowledge the nurse had, the greater her intention to provide care to prevent cervical cancer. A relationship between subjective norms and the nurse intentions, however, was not observed. Qualitative data, however, documented how religio-cultural beliefs would influence how they would care for a patient. These findings underscore the need for nursing education about cervical cancer prevention in Saudi Arabia.

CHAPTER ONE

INTRODUCTION

Cervical cancer is the third most common gynecological malignancy among the women in the Kingdom of Saudi Arabia. The incidence is around 1.9 cases per 100,000 women per year. Although this is a comparatively low incidence rate, the problem is that 40% of cervical cancer cases are discovered in late stages due to lack of cervical cancer screenings in Saudi Arabia (Al-Mendeel, et al., 2016). The population of Saudi Arabia women is 6.51 million, including women ages 15 years and older who are at high risk of developing cervical cancer according to World Health Organization. Every year, 152 women in Saudi Arabia are diagnosed of cervical cancer and 55 women die from it (Jeddah Cervical Screening Program).

Furthermore, cervical cancer is the fourth most common cancer that affects women worldwide, with an estimate of 528,000 cases annually (Bansal, 2015). Cervical cancer was the third leading cause of cancer-related deaths among women around the world in 2012 (Carrasco & Waldener, 2016), with 266,000 deaths globally in 2012. The global mortality rate is 14.0 per 100,000 (Jiangli, 2015). Most cervical cancer, indeed, occurs in less economically developed countries (Bansal), whereas there is a low incidence of cervical cancer and HPV in Europe, North America, and Japan (Campos, Sharma, Clark, Kim, & Resch, 2016).

Cervical cancer can be easily prevented and cured, but most cases in Saudi Arabia are discovered at a very late stage due to a lack of accessible screening. The Papanicolaou (Pap) smear is the screening test that assesses any cellular changes in the cervix that may develop into cancer. Knowledge about the importance of Pap smears is an effective way

to discover the disease in an early stage and tremendously reduce the number of cervical cancer cases. Cervical cancer, if detected early, can be curable; the 5-year survival rate is as high as 92% (Bengtsson & Malm, 2014).

In addition to the Pap smear as a means for preventing cervical cancer, prevention of Human Papillomavirus (HPV) infection, a precursor of cervical cancer, through vaccination is strongly recommended (Bocchini, 2016). The HPV vaccine is safe and effective, and the best age to give the vaccine is 11 to 12 to have the best likelihood to prevent HPV- related diseases, as it was mentioned at the at the American Academy of Pediatrics 2016 National Conference and Exhibition (Bocchini, 2016). Given there is no way to know when the adolescent will become sexually active and will be exposed to HPV, it is crucial to convince parents that the HPV vaccine prevents cancer. Healthcare providers are in a unique position to reduce HPV- related diseases by recommending the vaccine for adolescents before they become infected with HPV (Bocchini, 2016). To date, the other types of cancers that are related to HPV infection, such as anal, penile, vaginal, vulvar, and oropharyngeal cancers have not been studied in Saudi Arabia (Alsbih, 2014).

Many factors increase the risk of acquiring HPV infections. Not only is sexual activity a factor, but age is a distinct factor, too. Researchers found that the prevalence of HPV is 80% among adolescents, and the HPV infection is mostly discovered at the age of 25 and younger (Choma & McKeever, 2015). There are various biological factors behind the reason of increased infection of HPV in young ages. During puberty, there is a process called a squamous metaplasia that supports HPV replications; this process impacts cell transformation, making it more rapid. Squamous metaplasia contributes to

the acquiring of HPV infection. Also, using oral contraceptives which promote cervical eversion of the squamo-columnar junction will increase the risk of having cancerous lesions from HPV infection. In addition, smoking has a huge effect on HPV persistence (Choma & McKeever, 2015).

To deliver valuable services that can make a positive change for the community, it is important to know the cultural and religious background of each patient (Winkelman, 2009). There are 1.6 billion Muslims around the world. Islam is considered the second largest religious group after Christianity (Darrell & Rosario, 2014). Although Muslims come from different ethnic backgrounds, their religious beliefs play a major role in their decisions regarding any health-related problem – from their views about getting diseases to the interaction between Muslim patients and their healthcare providers, who may be of a different gender. Supporting Muslim beliefs and practices could pose a challenge for the healthcare providers in any healthcare setting (Padela, Killawi, Heisler & Demonner, 2010).

Women in the Kingdom Saudi Arabia (KSA) are perceived to have a health disadvantage when it compared to men due to gendered power (Alyaemni, 2013). Health care facilities are free in Saudi Arabia, but many procedures require male permission to seek medical care. Saudi law requires a male guardian's approval before women seek work, education, travel, or any government documents. KSA has one of the fastest growing populations around the world. Although in 2003, Vincent reported the average woman gave birth to seven children, this number dramatically dropped to 2.81 births per woman in 2016 (Central Department of Statistics and Information, 2016). This rate, however, is still higher than the global average of 2.7 births per woman. Presently, Saudi

Arabia has a population of more than 25 million, and the current growth rate is 1.536 percent (Albrithen, 2015).

Knowledge about cervical cancer screening and HPV vaccination can reduce the cervical cancer mortality and morbidity rate among Saudi women. Nurses are the largest population among all the healthcare providers, and they are the front line of patient care. Their knowledge about cervical cancer prevention could help to educate the women in their communities to address the importance of many health issues. Personal anecdotal and preliminary empiric evidence, however, suggest that Saudi nurses lack knowledge about cervical cancer prevention methods.

Lack of knowledge about cervical cancer prevention, however, presumably contributes to the morbidity and mortality rate among Saudi women. Because cervical cancer often discovered in late stages in Saudi Arabia, it requires the healthcare providers to use many invasive treatment options such chemotherapy and radiation. However, if the precancerous cells are discovered on the routine Pap smears, it will effectively minimize patients' exposure to the invasive treatments. Also, HPV vaccine can prevent HPV-related diseases. Thus, healthcare providers—including nurses, must have this knowledge about cervical cancer prevention methods.

A team from McMaster University in Canada (which provided methodological support) joined the Saudi Center for Evidence Based Healthcare to implement a national screening program to treat precancerous lesions of cervical cancer (Al-Mandeel, et al., 2016). The joint groups worked together to update existing WHO cervical cancer screening guidelines to make those guidelines applicable to Saudi patient values and preferences in the treatment options. The guidelines were designed to reduce the cervical

cancer incidence by alerting the public and the government agencies about the importance of HPV screening, triage, and vaccination. The target audience for these guidelines were only gynecologist and family physicians. The panel experts from the two organizations recommended a universal screening for precancerous cervical dysplasia among Saudi women and suggested using HPV testing and or cytology (Al- Mandeel, et al., 2016).

Purpose and Aims of the Study

This study will assess the knowledge and the subjective norms about HPV infection, cervical cancer (CC), and its prevention through screening and human papilloma virus vaccination among Saudi nurses. By learning what nurses—who typically are the frontline healthcare providers for women, know and believe, future training can be designed for them that will in turn benefit the women for whom they provide care. Furthermore, by studying Saudi nurse intentions, we can understand how Saudi culture influences what is known and practiced.

Research Questions

1. To what extent do Saudi nurses practicing in Saudi Arabia have knowledge regarding causes and prevention of HPV infection and cervical cancer?
2. To what extent do Saudi nurses practicing in Saudi Arabia think Islamic religio-cultural norms impact Muslim women's cervical cancer screening, HPV vaccination, and health check-up behaviors?
3. To what extent do Saudi nurses intend to provide care aimed to prevent cervical cancer to patients/parents?

4. How are demographic and work-related factors associated with knowledge and attitudes, perceived religio-cultural norms, and intention to promote cervical cancer screening and HPV vaccination?

I am going to examine how the concepts used in the Theory of Reasoned Action can guide the study of how attitudes and subjective norms would influence Saudi nursing care. It is expected that knowledge, attitudes and subjective norms of Saudi nurses will predict their behavioral intentions, which would ultimately lead to nursing care behaviors. The attitudes toward cervical cancer (CC) screening and prevention behavior examined in this study will include the nurses' knowledge and beliefs about cervical cancer screening and HPV infection and vaccination. It is assumed that if nurses have accurate knowledge and positive attitudes about the importance of the Pap test and HPV vaccine, they will provide patients with information about the importance of cervical cancer screenings (i.e., behavioral intentions). Subjective norms are important factors that affect decisions regarding any health issue. These norms include behavioral and cultural trends that affect personal decision-making when implementing cervical cancer screenings. In this study, the norms to be studied include Islam-influenced perspectives about seeking health care.

Definition of Terms

CC: Cervical Cancer

Papanicolaou test (Pap test): It is a simple test that can be efficient to detect any cervical cell changes. To do a Pap test, the doctor or nurse inserts a speculum into the vagina. The speculum is a device that separates the walls of the vagina so the doctor or the nurse can see the upper part of the vagina and cervix.

Human Papillomavirus (HPV): is the most common sexually transmitted disease worldwide. HPV is so common that approximately most sexually active people get it at some point in their lives.

HPV Vaccination: Numerous types of HPV vaccines have been established and tested in clinical and preclinical trials to prevent HPV infection.

Significance of the Study

There is a lack of evidence regarding knowledge and beliefs about HPV infection, CC, and HPV vaccination among Saudi Arabian women. By addressing this knowledge gap, this study will provide evidence with significance for nursing practice, education, policy, and future research.

Significance for Nursing Practice

Nursing is a growing profession in Saudi Arabia. Saudi nurses are making many efforts to show the public and other healthcare providers that they have adequate knowledge and skills to promote patients' care. In this study, the researcher will investigate the nurses' knowledge about cervical cancer prevention methods, and their intention to educate the public about the importance of the methods used to prevent cervical cancer and other HPV-related diseases. This study will identify if the Saudi nurses have limited knowledge about cervical cancer prevention methods so educational lectures can be given to them. Because HPV is a sexually transmitted disease, understanding how the religious/cultural practices can impact nursing care is very important. The study findings will have a positive impact on decreasing the morbidity and mortality rate among women with cervical cancer in Saudi Arabia. As a preventive method, the public will be aware about HPV vaccination to prevent any HPV-related

diseases. Also, the Pap smear can then be used to discover any precancerous lesions in the cervix at a very early stage. For example, in the annual checkups for women, the nurse practitioners can explain the importance of Pap smears in discovering cervical cancer in early stages. This study will be beneficial for nurses, in that it can prompt exploration into how to provide educational information and guidance to the public.

Significance for Nursing Education

One of the core roles of nursing is education. This study will begin to explore the wider concern regarding this dearth of education by investigating the knowledge of those who are best positioned to provide the knowledge to the public, to patients – Muslim nurses in KSA. This study will add an important piece to the nursing education which is how important it is to understand the nurses' religious/cultural beliefs and how they impact their care. CC in Saudi Arabia occurs not because of a lack of financial resources; rather, it is the researcher's opinion that morbidity and mortality associated with CC occurs, in large part, because of the cultural and religious beliefs that prevent healthcare providers learning about and providing cervical cancer prevention. It is vital to teach Saudi nurses about how to address the issues of cervical cancer prevention, and how to respect cultural norms while doing so.

Significance for Policy

Nurses engage in politics and policy-making to achieve public health outcomes. Findings from this proposed study will inform Saudi nurse policy-makers and educators as they strive to raise awareness and start discussions about CC, HPV infection, and the HPV vaccine. The findings of this study will show the policy-makers to what degree nurses intend to educate the public about cervical cancer prevention methods. The policy-

makers will be motivated to implement policies and procedures for national healthcare that will allow for nurses to practice one of their primary roles, which is education of individuals and collectives.

Significance for Research

The Theory of Reasoned Action (TRA) will help to guide the study by exploring how the knowledge, attitudes, and religio-cultural norms will affect the nurses' intentions regarding the cervical cancer prevention methods. Thus, the study will test elements of TRA to see if it applies in this context of KSA. The study will also develop and provide further refinement for scales for future use in Muslim or Middle Eastern contexts. In addition, other researchers can do better research on this topic because they will have a good source of information after the findings from this study.

Chapter Summary

In conclusion, this chapter introduced why a study about knowledge of cervical cancer prevention methods among Saudi nurses is important. A brief introduction about cervical cancer screening methods was discussed. In addition, the research questions and the significance of the study for nursing practice, policy, education, and research were also summarized. The literature review and the method sections will be discussed in Chapters 2 and 3.

CHAPTER TWO

LITERATURE REVIEW

The purpose of this chapter is to summarize and synthesize the literature that informs this study about the Saudi nurses' knowledge, subjective norms, and their intention to promote cervical cancer prevention methods. The chapter is organized in the following way: First, an overview of HPV and cervical cancer. Next, HPV vaccination programs are discussed. After that, barriers to screening and treatment in Muslim cultures is discussed. Finally, the theoretical framework is discussed.

HPV and Cervical Cancer: An Overview

Databases used to obtain information including but not limited to, EBSCO, and PubMed, and CINAHL from Loma Linda University Library. I have used them all because it was very hard to find a lot of information about cervical cancer prevention in Saudi Arabia. The terms *cervical cancer, HPV vaccine, Saudi Arabia, Pap smear, knowledge, and Islam* were used for the search. Inclusion criteria consisted of English language publications.

Etiology

Human Papilloma Virus (HPV) is the most common sexually transmitted disease worldwide (Kroupis & Vourlidis, 2011). HPV is an epitheliotropic species-specific virus that consists of a very small, circular double-strand DNA. Furthermore, HPV belongs to a large family called *Papillomaviridae*, which consists of 16 genera. HPV genera have more than 128 different genotypes, yet only 106 of them infect humans (Kroupis & Vourlidis). Some types of HPV are called "low-risk" viruses because they rarely cause cancers; the other types, called "high risk," have a direct impact on cancer development.

However, some women with the “high risk” virus will not develop cancer (Bissel, 2006). The most dangerous types of HPV are HPV 16 and 18, which are very carcinogenic. Those types have the ability to cause cellular abnormalities, but they can be detected by a regular Papanicolau (Pap) smear. Most HPV infections disappear within two years, but a few will progress to cancers (Kroupis & Vourlidis).

Cervical cancer is a rare complication resulting from a high-risk HPV type. HPV16 causes around 61% of the cervical cancer incidence around the world. Similar HPVs cause other types of cancer, such as malignant proliferations in the penis (33% prevalence), anus (88% prevalence), vulva (29% prevalence), and vagina (74%) (Parrage, 2016). The infectivity rate of HPV is very high. It can be transmitted with an estimated rate of 40-60% per coital act. HPV infects the basal layer of the epithelium that leads to thickened and sometimes exophytic epithelial lesions. Most of both low and high types of HPV infections are cleared by the immune system. The average duration of HPV infections that cause cervical cancer is 8 months; 70% of those infections are cleared by one year and only 90% are cleared within two years. Ongoing exposure to HPV infections, may progress slowly to invasive cervical cancer in 5 to 10 years (Jorge & Wright, 2016). Studies have shown that 75% of people who are sexually active will get an HPV infection at some point in their lives. People might not even realize they have the infection because sometimes it can occur without any symptoms and disappear without any treatment. There is no way to determine when the individual was infected with HPV because the virus can remain in the body for weeks or years without any signs of infection (Bissel, 2006).

The main risk factors for HPV transmission are having many recent sexual partners and having sexual intercourse at a young age (Cornelius, Michaele, Andreas &Yvonne, 2104). Frequent exposure to HPV leads to a negative impact on the individual's health as it is one of the causes of cervical cancer. It is important to keep in mind that being infected with one type of HPV means that the person is not immune against the other HPV types (Chandra, 2013). Studies have indicated that women who suffer from cervical abnormalities or cervical carcinoma are at high risk of being infected with multiple HPV genotypes. A study that took place in the United States showed different HPV genotypes were detected in one specimen. A study in Indonesia also found 12 genotypes in one specimen (Chandra, 2013).

Realizing HPV as the etiological factor for cervical cancer and other HPV related malignancies, scientists have been empowered to discover a vaccine and other therapeutics procedures to protect against HPV-related diseases, as well as the means for diagnosing HPV in early stages (Yang, Farmer, Wu & Hung, 2016). One of the main issues regarding the treatment of cervical cancer is the high recurrence rate after remissions and the progression of illness. Although, radiotherapy and chemotherapy can effectively treat cervical cancer, post-treatment relapse is still a major problem (Das et al, 2015).

Prevention

Cytology screening (Pap smear) and HPV vaccinations are the two effective prevention methods against CC and other HPV infections. Pap smear is a simple operation in an early stage can remove the cancerous cells and prevent cervical cancer.

There are two HPV vaccinations on the market that fight against the most dangerous types of HPV (16/18) (Walden, 2013).

Screening Approach (Pap smear)

The Pap smear is the screening test that looks for any cellular changes in the cervix that may develop into cancer. A Pap smear is performed through a simple procedure; a spatula is used to scrape the cellular materials from the squamocolumnar junction that is located in the cervix and then smeared onto a tube made of glass slide about 25 x 500 mm (Bengtsson & Malm, 2014). The cervical cancer screening test was named Pap smear because the one who first suggested this test in 1928 was named Papanicolaou. It was accepted into mainstream medicine fifteen years later.

The rationale behind the Pap smear is that cellular changes that may transform into cancer are discovered in an early stage and require only a simple operation to prevent cervical cancer (Bengtsson & Malm, 2014). Cervical cancer screening programs utilize cervical cytology screening using a Papanicolaou (Pap) smear. Cervical cancer screening programs have not been effective in low and middle-income countries due to lack of health delivery systems and inadequate resources due to economic and social instability (Campos, Sharma, Clark, Kim & Resch, 2016)

Vaccination

Numerous types of HPV vaccines have been established and tested in clinical and preclinical trials. These vaccines include live vector, protein, nucleic acid, and cell based vaccines (Yang, Farmer, Wu & Hung, 2016). In 2006, a quadrivalent vaccine (Gardasil) was released to the public. Then in 2007, a bivalent vaccine (Cervarix) became the second HPV vaccine in the European market, and in 2009, in the United States. It is

expected that the use of those vaccines worldwide will decrease the incidence of HPV related diseases among men and women (Jorge & Wright, 2016).

These two effective HPV vaccines, Cervarix and Gardasil, prevent infection among the most dangerous types of HPV and are expected to reduce the cases of cervical cancers and other cancers associated with "high risk" HPV (Walden, 2013). The first vaccine, Cervarix, protects against HPV types 16 and 18, those strains considered the most "high risk" HPV. To give good protection against HPV, the vaccine should be given between the ages of nine to twenty-six. The second vaccine, Gardasil, protects against HPV types 16,18, 6, and 11, which cover not only cervical cancer but also anal cancer and genital warts. According to the CDC, HPV vaccines are very safe, but they can have side effects similar to other vaccines including dizziness, fainting, and soreness around the injection site. For the people who did not receive the vaccine around the age of 9 and who are already sexually active, the vaccine will not offer any protection if they are already infected with HPV. The vaccine only will protect them against different HPV types if they are included in that vaccine (Walden).

Cervical cancer prevention and treatment is considered one of the greatest successes in medicine, starting with the development of the Pap smear, and then the inventions of HPV vaccine. The challenge for the healthcare provider is to educate the public about the importance of the screening and the vaccination through school based educational programs to ensure the widespread acceptance of HPV vaccine (Jorge & Wright, 2016).

Cervical Cancer Prevention

Cervical cancer is the only cancer that can be controlled at a very early stage

through organized screening programs that detect precancerous lesions. Because of such screening programs, the average rate is around only 10 per 100,000 women (Kileo, Michael, Neke & Moshiro, 2015) in Japan, Europe, and North American where screening is common. However, these low rates are not observed on the other continents. Cervical cancer screening programs have not been effective in low and middle-income countries due to lack of health delivery systems and inadequate resources due to economic and social instability (Campos, Sharma, Clark, Kim & Resch, 2016). Indeed, 85% of deaths from cervical cancer occur in low and middle-income countries.

The implementation of the Pap smear was not always successful due to many reasons such as low availability of Pap smear in the healthcare facilities and poor quality laboratories in many countries. Despite the availability of cervical cancer screening there was no significant reduction in the mortality and morbidity rate of cervical cancer in some countries such as Mexico (Kulasingam, 2007). The scientists knew the cause of cervical cancer is HPV, which lead them to develop the two vaccines to prevent infection from many types of HPV. To date, the vaccines show high efficacy in preventing HPV infection and pre-cancerous cervical lesions in exposed women. Those vaccines were approved in many countries when it first was released; these countries included Australia, USA, Brazil, Mexico, Canada, New Zealand, as well as those in the European Union (Kulasingam, 2007).

In October 2011, The United States Centers of Disease Control and Prevention (CDC) recommended HPV vaccines to be given not only to the girls, but to boys, too. The advisory panel of the CDC justified giving the vaccines to the boys to prevent the HPV infection in them, so the girls will not be affected by HPV infection during sexual

intercourse. In addition, HPV vaccine is recommended for boys because the infection can lead to genital warts, anal cancer, oral cavity cancer, oropharynx cancer, and possibly head and neck cancer. The issue of giving boys the HPV vaccine was debated. For example, the medical director of the immunization programs and vaccine-preventable diseases for the British Columbia Centre for Disease Control said (BCCDC), “I think the benefits are there, but the costs are high.” However, the committee of the BCCDC stated that although the HPV-related cancer is low among boys, the rate has been increasing in the recent years (Eggertson, 2012).

In Africa, five studies that investigated cervical cancer prevention all shared the same conclusions. The studies were done in Ethiopia, Malawi, Ghana, Somalian women in the Netherlands, and integrative review to examine the literature relating to barriers to cervical cancer prevention methods in Sub Saharan Africa. The authors concluded that there are client, providers, and healthcare system barriers to obtain cervical cancer prevention methods. Each study will be discussed briefly below.

In Ethiopia, Mitiku and Tefera (2016) observed that 27.19 million women there were at risk of contracting cervical cancer. They observed a yearly increase in the number of women who were diagnosed with cervical cancer. The estimation is that 7,095 cases of cervical cancer and around 4,732 deaths occur every year in Ethiopia due to the nonexistence of national screening programs, low access to the healthcare delivery system, and lack of knowledge about the disease among women. A cross-sectional study conducted in Addis Ababa, the capital city of Ethiopia, with a sample of 634 women at reproductive age (15 to 49 years) found that 57.7% of these women had heard about cervical cancer, and 41.9% had knowledge about at least one risk factor of cervical

cancer. The majority of participants who knew some risk factors attributed CC to having multiple sexual partners. Forty-one percent of the women knew that cervical cancer could be prevented, and 24% knew that reducing the number of sexual partners is a very helpful prevention measure. These findings indicate how educational level and economic status have an association with knowledge about cervical cancer (Mitiku & Tefera, 2016).

Another study was done in Malawi, in Sub-Saharan Africa, about cervical cancer screening uptake (Maribel, 2015). Malawi has the highest cervical cancer rate worldwide, with cervical cancer accounting for 45.4% of all cancers in women in Malawi. Due to the high cervical cancer incidence, the Ministry of Health in Malawi established a program for cervical cancer screening. The aim of the program was to do visual inspection with acetic acid (VIA) to cure the precancerous lesions. (VIA is a simple procedure that allows the healthcare provider to swab the cervix with acetic acid and observe for any color changes in the cervix. Normal cervical tissue does not change, unlike the affected area with precancerous and cancerous lesions, which will turn white.) (Maribel). The screening programs were implemented between 2011 and 2015. Over this five-year period, only 9.4% of the participants were treated for cervical cancer, indicating a failure in the program because the target was 80%. The reason for this failure was the poor healthcare infrastructure, such as high turnover of staff who were experienced in providing cervical cancer screening. The high cost of providing treatment in a Third World country in Africa makes providing CC screening for needy women challenging to be provided to the women who are in need (Msyamboza, Phiri, Sichali, Kwenda & Kachale, 2016).

In Ghana, the rate of cervical cancer is 26.4 per 100,000 women per year, and it is the most common cancer affecting women (Opoku, et al, 2016). Around 7 million women at child-bearing age are at risk of having cervical cancer. Opoku and colleagues studied 300 women who responded to a questionnaire about their knowledge of the risk factors for cervical cancer. The results showed that the majority of the participants (66.7%) had never heard about cervical cancer, and only 23% were aware of the risk factors. Only 14% knew of screening programs that could detect cervical cancer and only 3% had participated in cervical cancer screenings (Opoku et al, 2016).

Jihan, Verdonk, Boer & Abma (2015) conducted a qualitative study to discover perceptions toward cervical cancer prevention measures among 14 young Somali women and six Somali mothers in the Netherlands. This study is important because in Somalia cervical cancer is the second most common cancer among women in the reproductive age. In the Netherlands, around 3 million women aged 15 and older are at a high risk of having cervical cancer. Yearly, there are around 967 diagnosis of cervical cancer and 546 deaths. Jihan and his colleagues' results showed that many barriers affect the decisions about the preventable measures of cervical cancer among the Somali women in the Netherlands. These included distrust of the Dutch healthcare system, embarrassment to do a Pap smear because of a male practitioner, and Female Genital Mutilation (FGM) alongside the value of chastity and the religious beliefs that prohibit sex before marriage.

Another study that examined cervical cancer rates in many countries in Sub-Saharan Africa found that cervical cancer is the most common cancer among women (Mcfarland, Gueldner & Mogobe, 2016). The study reviewed all the published articles between 2006 and 2015 in sub-Saharan Africa that described that barriers to Pap smear.

The rate of new cases is around 34.8 new cases and 22.5 per 100,000 women die from it. The countries where cervical cancer is most prevalent are Botswana, Ethiopia, Ghana, Kenya, Malawi, Nigeria, South Africa, Tanzania, Uganda, and Zimbabwe. Three barriers to screening were discovered from the studies done in those countries. These barriers included client barriers, which included a lack of knowledge and awareness of cervical cancer, fear of cervical cancer, and resistance to the Pap smear. The fear resulted from anxiety about the possibility of having positive results, beliefs that they would lose their virginity (because it is a vaginal test), and stigmatization from their community (because they would be viewed as sexually active if they engaged in the screening tests). Further, beliefs and attitudes toward health and illness included the perception that if they did not have any symptoms, they did not need to do any screening. Cultural and religious factors that prohibited them from exposing their body to men other than their husband was another barrier. Also, sociodemographic factors such as cost, education, age, and time to travel to health facilities were associated with cervical cancer screening. The free screening tests were available only for women over 30. Married women needed an approval from their husband to do the test, and most of the husbands refused and were generally unsupportive. Secondly, provider-related barriers existed. These included, inadequate education and advising to the women to do cervical cancer screening. Thirdly, system barriers existed, including inaccessibility and unavailability of screening services for cervical cancer (Mcfarland, Gueldner & Mogobe, 2016).

The incidence of CC is not only high in Africa, but also in Latin America. Many studies addressing how to reduce the incidence of CC have been conducted on that continent as well. In 2012, around 28,000 female deaths were from cervical cancer in

Latin America (Carrasco & Waldner, 2016). In Brazil, in 2010, the rate of cervical cancer was 46.2 per 100,000 women, making it the second most common cancer among women in Brazil. This high rate is comparable to the low-income underdeveloped countries' rate. Due to this high rate, a school-based cross sectional study was conducted to evaluate the HPV vaccination coverage, because it is the primary preventive method to protect against cervical cancer (Farias, et al., 2016). The results indicated high HPV vaccination compliance among the students (N=797). Around 95% of the students had taken at least one dose of the HPV vaccine. From the study, researchers discovered the factors preventing some students from taking two doses of the vaccines; these included availability and distribution system of HPV vaccine, cultural issues, family impact, and socioeconomic reasons. Parents stated that the main reason that discouraged them from obtaining HPV vaccination for their children is misinformation about the vaccine (Farias, et al., 2016).

One study from Asia investigating cervical cancer screening and prevention was conducted. China has a lower rate of cervical cancer compared to the rest of the world (Jiangli, 2015). The mortality rate was 7.5 per 100,000 women, compared to the global rate of 14.0 per 100,000. However, China has a large population so their cervical cancer incidence accounts for 11.7% of the world annual cases and for 11.3% of the deaths from cervical cancer worldwide (Jiangli, 2015). The study was conducted in the rural areas in China to investigate the knowledge about utilizing cervical cancer screening among women from different socio-economic groups. Face to face interview questionnaires were given to 308 women who did the cervical cancer screenings. The result showed that only 19.5% of the participants had knowledge regarding the screening program. The main

socio-economic factors associated with the lack of knowledge were older age (55- 64 years old), and low level of education. Likewise, women who did not receive any advice from their primary physicians about the importance of receiving cervical cancer screening also lacked knowledge about CC screening (Jiangli).

Islamic and Middle Eastern Cultures

The incidence of cervical cancer among Muslims is increasing (Nahvijou, et al., 2016). In Iran, there are about 5 cervical cancer cases per 100,000 women. Because of this low incidence rate, cervical cancer screening programs in Iran were not given attention from healthcare providers, and that led to discovering cervical cancer in very late stages. One Iranian study sought to determine how to encourage cervical cancer screening programs while being cost effective (Nahvijou, et al., 2016). The statistical model that these researchers constructed indicated that the most cost-effective strategy is to do the screening at age 35 years and repeat the screening every 10 years (Nahvijou, et al.). The model (i.e., an 11- factor Markov model) acknowledged involved life years gained, lifetime costs, quality-adjusted life years, and incremental cost-effectiveness ratios as factors important to consider.

Syed et al (2010) observed that the cervical cancer incidence in Pakistan is unknown, and that such epidemiological data is available only through the regional cancer registries. However, these data may not represent the exact mortality and morbidity rates of cervical cancer in Pakistan. According to Pakistan registry, there is only a 3.6% cancer mortality rate, and 5% of the women know about the Pap smear screening. Then a cross-sectional, interview-based survey was conducted by Syed and colleagues in three big hospitals in Karachi, Pakistan. These surveys were given to the

interns and nurses (N=400) to test their knowledge and awareness about cervical cancer. The results showed that although 23.3% knew that cervical cancer is the most common cause of gynecological cancers, 1.8% were not aware that cervical cancer is a disease. Other findings included: 78% of participants were aware that the main cause of cervical cancer is a virus and 61% knew HPV was the virus causing cervical cancer. Only 41% knew HPV can be detected in its early stage by a Pap smear, and only 37 participants out of the 400 were aware of HPV vaccinations.

Bangladesh is another Muslim country in which cervical cancer is considered a real threat to the women who are of child-bearing age. Cervical cancer is the second most common cancer among women in Bangladesh with an estimated 11,956 new cases and 6,582 deaths in 2012 (Nahar et el, 2014). A baseline survey data was conducted in of the rural and urban areas in Bangladesh (N= 1,113), Pap smears were provided to all the participants. The result showed HPV infection was about 7.7% among the women from the urban and rural areas. Working women (who mostly worked as housemaids) had higher incidence of HPV infection than housewives. Also, results indicated that rural women whose husbands lived overseas were twice as likely to get infected with HPV. The authors recommended providing the women in Bangladesh with health education about HPV, including encouragement for women to get HPV vaccines (Nahar et el).

In Malaysia, another society where Islamic mores prevail, cervical cancer is the second most common cancer among women (Wong, 2011). It contributes to 12.9% of all female cancers. Wong conducted a quantitative study in Malaysian rural areas to assess the level of knowledge and attitudes regarding cervical cancer and HPV among 499 women aged18-25 years. A questionnaire was used during face-to-face interviews to

assess their knowledge about cervical cancer. Important findings were that the majority (79.7%) were not aware HPV is the main cause of cervical cancer. Only 8.5% of the participants knew about the mode of transmission of HPV, while 89.3% specified they were not aware HPV infection is common.

In the United Arab Emirates, cervical cancer is the seventh leading cause of death for women (Khan & Woolhead, 2015). Usually, cervical cancer is discovered at a very late stage, and the number of cases is increasing yearly. The increasing rate in 2010 was 7.4 per 100,000 women in the UAE. A qualitative study was done with 13 participants to explore Muslim women's perspectives toward cervical screening in Dubai. The barriers to cervical cancer screening they observed included pain, embarrassment, and cultural issues negatively influenced the screening uptake (Khan & Woolhead). These researchers found that participants' faith in God removed the fear of cancer diagnosis in some Muslim women, and many women were unaware of CC symptoms or the importance of the screenings.

Saudi Arabia

In Saudi Arabia, which has a population of 6.5 million women, there are around 152 new cases of women diagnosed with cervical cancer per year, and 55 die annually (Alobaid et al, 2014). The prevalence of cervical cancer in Saudi Arabia is only 2.4% of all new cancer cases among women (Alsbeih, Al-Harbi, Al-Sebaie & Al-Badawi, 2013). It ranks as the eleventh most common cancer among Saudi women (Alhamlan, Al-Qahtani, & Al-Ahdal, 2016). These cervical cancer statistics were taken from the Saudi Cancer Registry in 1994; the data were collected from more than 500 public and private hospitals, cancer treatment centers, and pathology laboratories. The exact number of

cancer cases cannot be ascertained, but the collected data are an estimation of numbers of the real cases in the population (Alsbih, 2014). According to WHO, the cases of cervical cancer are increasing. In 2014 it was 152 then it becomes 241 cases in 2017.

Saudi Arabia, in comparison with the rest of the world, has a very low rate of cervical cancer. The reason for this low rate is unknown. Some assume that because Saudi Arabia is a conservative country with a closed society, this contributes to preventing women from being exposed to the HPV virus. Also, male circumcision in Saudi Arabia is part of the Islamic religion, and that could reduce the risk of penile HPV infection, and thus decrease the risk of transmitting to their female partners pathogens that cause cervical cancer. The low rate of CC in Saudi Arabia, as well as the behavioral and cultural trends, will affect personal decision making when implementing a national HPV vaccination program (Alsbeih, 2014).

Another study conducted in Khobar, Saudi Arabia determined the incidence of cervical cytology abnormalities between 2004 and 2013. This case control study analyzed data collected from a university hospital database. The inclusion criteria included Saudis who had had abnormal Pap smears. The results showed low incidence of abnormalities in Saudi Arabia. However, the incidence of abnormal cervical cytology has increased dramatically around 6.1% from 2010 to 2013 among the Saudi women. That is, 2.5% of the women who had done Pap smears had abnormal results. The researchers suggested encouragement of women to do regular Pap smears at an earlier age (Mahalli, 2015).

An observational, cross sectional study done in Saudi Arabia with data from 2010 to 2011 at three hospitals identified not only prevalence of HPV, but also patients' awareness of HPV (Alobaid, 2014). Cervical samples were collected from women aged

15 years and older who were attending routine gynecological examination. The results revealed that the prevalence of HPV was 9.8% and was higher among women who were 55 and older. Also, participants were given questionnaires about awareness of HPV infections after their routine Pap smear. Of the 450 participants, 32% were aware of HPV infection, and 89% indicated the acceptability of HPV vaccine (Alobaid).

In Riyadh, Saudi Arabia, a study took place to collect cervical specimens from 519 Saudi and non-Saudi patients (Bondagji, Gazzaz, Sait & Abdullah, 2013). Among all the specimens, 164 (31%) were HPV positive. Of the 164 cases, HPV 16 was the most commonly found virus (observed in around 87.8% of the cases). HPV 18 was found in 86% of the 164 cases, and the HPV 11 was in 78.3%. This study documented that HPV is common in Riyadh, Saudi Arabia, with nearly one-third of women having it (Alahdal et al., 2014). Alahdal and colleagues shared the same conclusion as Balaha and colleagues (2011) who conducted another study in the Eastern part of Saudi Arabia. Balaha et al. conducted a retrospective study of 1171 cervical smear specimens from a maternity hospital in Saudi Arabia between 2003 and 2010. Their results showed that 624 (53.3%) had abnormal cervical smears (Balaha, Al Moghannum, Al Ghowinema & Souad, 2011). However, another study done in the Western region of Saudi Arabia did not show the same conclusion. Four hundred eighty-five Saudi women who attended the gynecology clinics were tested for high-risk HPV infection. Only 27(5.65%) were HPV positive with the high-risk type (Bondagji, Gazzaz, Sait & Abdullah, 2013).

Another study in Saudi Arabia discovered an association between ovarian cancer and HPV. Shabnaha and colleagues (2013) found that the high-risk form of HPV (i.e., 16 and 18) is associated with ovarian cancer. Ovarian cancer is the seventh most common

malignancy among women in Saudi Arabia, and it accounts for 3.1% of all newly diagnosed cases of cancer among women aged 50 years (Shabnaha et al., 2013).

Alhamlan, Alqahtani & Al-ahdl (2015) underscored that the low incidence of HPV in Saudi Arabia may be due to the limited research in this conservative country, and not reflect the actual incidence. These researchers suggested that CC incidence in Saudi Arabia was unrealistic when compared to the other countries in the same region. Saudi Arabia has only a 2.2% rate of cervical cancer cases, which is very low when compared to a 68% rate for the other countries in Asia of the same region (Alhamlan, Alqahtani & Al-ahdl). Researchers have predicted that vaccination will lower the incidence rate by two-thirds of CC in Saudi Arabia (Alhamlan, Alqahtani & Al-ahdl).

Unfortunately, most of the research presented here provided evidence that there is a lack of awareness in the Saudi population (Sait, 2009) as well as among Saudi healthcare providers (Sait, 2011) regarding HPV infection, screening, and vaccination. A cross sectional study have been done in Jeddah, Kingdom of Saudi Arabia using 600 self-administered questionnaires were distributed to randomly selected women. The result of this study indicated that 85.6% of the women were not aware of HPV as a risk factor for cervical cancer, and only 84 (16.8%) of the participants had ever had a Pap smear. The author shed light on the importance of education of the healthcare providers to promote cervical cancer prevention methods, because the study showed that 45% of the women who had done a previous pap smear stated that their physician had recommended it. Of those women who had not had a previous Pap smear, 18.3% stated that their physician had not recommended it (Sait, 2009). The awareness of cervical cancer among the Saudi population is far behind the developed countries. Education is needed to promote

awareness to decrease the mortality and morbidity rate of cervical cancer in the Saudi population (Sait).

Summary

The study included 18 articles that discussed cervical cancer prevention around the world. All of the studies were quantitative except one study in the UAE was qualitative study. The result shows that cervical cancer cases have declined in the developed countries comparing with the other undeveloped countries especially the Muslim countries. CC is considered the third leading cause to death in the middle and low-income countries (Al-Mandeel et al., 2016). Yet in KSA, incidence and prevalence for CC is very low (less than 3%). Although cervical cancer is preventable, most women in Saudi Arabia are diagnosed with CC in very advanced stages that require extensive treatment, such as surgery, radiotherapy, and chemotherapy (Alhamlan, Alqahtani & Al-ahdl, 2015). Therefore, providing knowledge to healthcare providers and consumers about HPV is very important to reduce the incidence of CC.

Barriers to Screening and Treatment in Muslim Cultures

Overview

There has been a significant decline in the incidence of cervical cancer in developed countries due to their tremendous efforts to screen for cervical cancer using Pap smears (Vahabi & Lofters, 2016). However, there are some groups who experience challenges in accessing these important health screenings. For example, women in Muslim countries have less access to cervical cancer screening tests, putting them at higher risk of advanced cervical cancer (Vahabi & Lofters, 2016). Many obstacles affect their decisions about being screened for cervical cancer. Some of these obstacles include

their religious beliefs about modesty, sexuality, and premarital virginity (Vahabi & Lofters, 2016).

Thus, existing evidence about the knowledge and attitudes regarding CC and HPV among patients and health care providers in Muslim cultures will be reviewed. Additionally, a review of Islamic religious and cultural mores will be provided to give greater depth of understanding to this issue. Finally, this section will review perception about illness (especially cancer) that are found among persons from Islamic societies.

Knowledge and Attitudes Deficit

Patient

Many studies have been conducted in Muslim countries, such as Kuwait, Qatar, Saudi Arabia, and Malaysia, to test knowledge and attitudes regarding cervical cancer screening (Khan & Woolhead, 2015). The results of these studies indicated that most these women were not aware of cervical cancer symptoms or the necessity of the Pap smear. Also, the women thought they were healthy because they were not experiencing symptoms, so they did not see the screening procedures as important (Khan & Woolhead, 2015).

A mixed method design that included questionnaires and focus groups was used to explore the Canadian Muslim immigrants' attitudes toward the cervical cancer screening (Vahabi & Lofters, 2016). Thirty Muslim immigrant women who lived in Ontario, Canada participated. The results revealed limited knowledge about cervical cancer, HPV, and Pap smears due to the difficulties in accessing sexual health information and cancer screening facilities. Such as systemic barriers (e.g., lack of a family doctor, inconvenient clinic hours, language barriers), and their religious beliefs

about modesty, premarital virginity and sexual behavior. Ninety three percent of women revealed they would use HPV self-sampling, which requires the woman take the sample by herself and then submit it for analysis of HPV. The authors emphasized the need to educate minority women about sexual health information (Vahabi & Lofters).

A cross sectional study investigated a group of Arab Muslim immigrant women in America about their knowledge and barriers about the cervical cancer screening programs using a self-administered questionnaire (Salman, 2012). Many factors were mentioned in the study such as religious and cultural beliefs, modesty and embarrassment issues, and financial concerns. The Arab community perceive cancer as a fatal disease and talking about it is considered unacceptable. The study concluded that educational programs are needed to raise awareness about cervical cancer within the Muslims community and that it respects their cultural and religious beliefs (Salman).

Hussain, et al. (2016) conducted a study in Saudi Arabia to determine the attitude and barriers toward HPV vaccination among young women. A culturally sensitive questionnaire was distributed using the interview-based model that includes quantitative and qualitative questions. The results showed that the majority of the 325 patients who were all the female patients came to the Family Medicine Department and their age was from 11 to 26. (72.6%) did not know that HPV is the main cause of cervical cancer. The results also revealed that the participants were strongly agreed with acceptability of HPV vaccines as very high (64.3%). In conclusion, the authors discovered that the knowledge about HPV, cervical cancer, and HPV vaccine are very low among young women. They proposed that education about HPV and HPV vaccines is needed in order to decrease the cervical cancer incidence in Saudi Arabia.

Healthcare Professionals

A qualitative study done in Zimbabwe to test healthcare providers' knowledge about HPV, HPV vaccine, and cervical cancer screening showed low levels of knowledge regarding HPV (Crann et al., 2016). Fifteen healthcare providers from a rural hospital participated in the study. The researchers conducted in-depth semi-structured interviews. Most of the participants were eager to learn more about those topics because cervical cancer is the leading cause of death across all types of cancer in Zimbabwe. The participants were very engaged in the study, and they suggested some possible solutions, including education and accessibility to healthcare. The major barriers were psychosocial, cultural, and hospital infrastructures (Crann et al). The policy makers from the same hospital made some suggestions to overcome those barriers such as improvements to roads, and access to public transportation to promote access to the healthcare clinics. In addition, it was recommended that the vaccine be free for everyone, and that healthcare providers be educated about the importance of the vaccines so they could educate their community to have successful vaccination programs (Crann et al).

Another study compared the knowledge and attitudes about HPV infection and vaccines between obstetricians (N= 142) with non-physician (N= 169) staff in Istanbul, Turkey (Naki, 2010). A questionnaire developed by the researcher that includes items concerning awareness, attitudes, knowledge about of HPV infection and vaccine was distributed to 311 healthcare providers. Physicians were more knowledgeable about the exact cause of cervical cancer and more aware of the types of HPV vaccines, which could, Naki conjectured, lead them to support HPV vaccination when compared with non-physician staff.

The result of this study is similar to another study done in Qatar about the female healthcare providers' knowledge regarding cervical cancer causes and screening (Alali, et al., 2016). A descriptive cross-sectional study using a self-administered questionnaire was conducted among 90 female healthcare providers. Ninety-two percent were aware of the cervical cancer screening, but they did not prefer to perform the screening by males' healthcare providers (Alali, et al.).

The study summarizes six studies that looked at the knowledge and attitudes deficits among patients and healthcare providers. Three studies (2 mixed methods, 1 quantitative) assess the patient's knowledge and attitudes; and other three studies (2 quantitative, 1 qualitative) assess the healthcare providers about their knowledge in most of the Islamic countries. All of these studies shed light on the importance of education about cervical cancer prevention methods among patients and healthcare providers because there is lack of knowledge in the Muslim community.

Islam: An Overview

The religious and cultural beliefs and practices of Muslims are important to consider when planning any healthcare provision. Thus, this section will provide an overview of Islam, its views about modesty, and beliefs about illness and CC screening.

Saudi Arabia is the largest country in the Middle East and the practiced religion of its people is Islam. Saudi lifestyle, decisions, and rituals are connected directly to this religion. Even the culture is mixed with the Islamic roles, as they are closely intertwined (Rafferty & Hibbert, 2015). Educating families and the healthcare providers is not an easy task in this conservative culture where religious values and beliefs have a direct impact on decision making.

Muslims are considered the second largest religious group after Christianity worldwide. There are 1.6 billion Muslims around the world. Muslims, like Christians and Jews, are monotheists who follow the Jewish patriarch Abraham (Bock & Rosario, 2014). As monotheists, they worship the only God (*Allah*), the God who built the heaven and the earth, the God of all humans and the God of all the prophets (Ramdan, 2007).

Islam means submission, but also means "peace" and "wholehearted self-giving" (Ramdan, 2007). The book of Genesis and the Quran both relate the story of Abraham when he had his first son, Ishmael, from his servant, Hagar, when he was an old man. Sarah, his wife, gave birth to Isaac and told Abraham to send Hager away with her son, Ishmael. Abraham sent his wife Hager and his son Ishmael to a place called Makkah in the Arabian Peninsula. Prophet Mohammed, born in Makkah in 570 AD, "peace on him," is a descendant of Ishmael's children.

Muslims believe that Prophet' Mohammed was the last messenger from God. Long before receiving prophethood, he was known among the Arab community for many special characteristics that are very rare to find in one person. Prophet Mohammed was known for his integrity, trustworthiness, honesty, and his compassion to the poor and the people who are really in need. Many people would leave their money with him because he was the most trusted man in the whole town (Ahsan, 2012).

The purpose of life in the Muslims' perspective is the worshiping of God, following the Quran, and complete devotion to God. Muslims are following two sources in their practical living, the Quran (which is the book from God) and Sunnah (practice and sayings of Prophet Mohammad). There are Five Pillars in Islam that all Muslims are obligated to do. The Five Pillars are: the confession (*Shahadah*) that Allah is the only

God and Mohammad is the prophet from God; five prayers at certain times every day; fasting one month in a year (i.e., Ramadan); giving charity from wealthy people and the people who can afford to give (i.e., *Zakkat*); and a pilgrimage to Makkah, the site where Mohammad was born (Mohammadi, Evans, & Jones, 2007).

The Islamic rules (*Shariah*) come from the Quran and Sunnah. The Quran is the primary scripture that provides most of the theology for Islam that includes lifestyle guidance and communal rules. The Sunnah provides explanations for what the Prophet Mohammed (Peace be upon on him) said and did. God provided to Prophet Mohammad the authority to be followed by all Muslims. As the Quran states, "For you the life of the Prophet is a model of behavior." Anything not mentioned in Quran, Sunnah explains it (Alarefi, 2009).

Muslims are committed to following Prophet' Mohammed footsteps (Peace be upon him) and apply his unique characteristics in their lives to live and work together in peace and harmony (Ahsan, 2012). There was always kindness and respect in the prophet's behavior toward women. He used to listen to them, and their opinions were acknowledged (Ramadan, 2007).

Modesty among Muslim Women

Modesty in the Muslim culture is considered one of the fundamental values in Islam. Two verses from the Quran support the religious idea of modesty, and most scholars have interpreted those verses to support the required wearing of the *hijab*. *Hijab* in the dictionary means screen, curtain, and veil (Guimond & Salman, 2013). The *hijab* for Muslim women is a representation of modesty and religious devotion. Many Westerners think the hijab represents oppression and inferiority, but if people understand

the veil or habit worn by nuns as a symbol of purity and faith, they should understand the hijab as the same thing (Guimond & Salman, 2013; Mujallad & Taylor, 2016).

Some Muslim women are unwilling to undergo cervical cancer screening because they believe that Western healthcare providers do not respect their religious views, modesty, or virginity. Also, they do not prefer male healthcare providers because of their desire to be modest. The pelvic examination is an invasive procedure, and it is only acceptable for married or pregnant Muslim women because they are not virgin. Due to that fact, Muslim women perceive cervical cancer screening as unnecessary because of the fear of loss of privacy and lack of knowledge about the importance of it (Guimond & Salman, 2013).

Islamic values regarding premarital sex prohibit this behavior and posit it is socially unacceptable (Smerecnik, 2010). The necessity of separation of men and women in society is a debatable issue in Islam. Many scholars agree that the separation of genders is acceptable in Islam, as long as the female modesty requirement is met through modest dress and the interactions with unrelated men are limited to only conversations that discuss professional and educational issues. There are some considerations and limitations that should be considered when males and females interact. They should discuss only their joint work, and this necessitates maintaining respect, and having limits between each other to prevent any prohibited relationship (e.g., sex outside marriage) that could occur between them.

Beliefs about Cancer and Other Illnesses

A systematic review that included 188 papers for patients who are between 8 years and 80 years old with different kind of diseases from 36 countries. The study was

done to see if there is a correlation between illness perceptions and other diseases such as depression, anxiety, diabetes, and quality of life. The result shows that there are a strong association between illness perceptions and the other illnesses (Broadbent et al., 2015). For this reason, the illness perception is an important part in this study. Muslims have their beliefs that have a big impact in their decisions regarding the care of the patients. Some of the beliefs will be mentioned in the paragraphs below.

"There is no disease that Allah has created, except that He also has created its remedy" (Bukhari). This is a *Hadith*, which is a statement by the prophet Muhammed. Muslims take this saying to mean that Muslim patients are helped in their health-related suffering. Also, this *Hadith* empowers healthcare providers and researchers to discover treatments for all kinds of diseases. Moreover, "God gives life, and He makes to die" (Quran 3:156). Hence, "A person dies when it is written" (Quran 3:185, 29:57, 39:42). The interpretation of this verse is that everything that has happened to us is fixed by God; we cannot change our destiny (Sachedina, 2005). Another powerful Hadith is: "No fatigue, nor disease, nor sorrow, nor sadness, nor hurt, nor distress befalls a Muslim, even if it were the prick he received from a thorn, but that God expiates some of his sins for that" (Bukhari). In other words, all people must not lose hope because God's plan will justify the good in the end (Sachedina, 2005).

Muslims' perceptions toward the causality of illness play an important role in dealing with illnesses. They are aware of the biological factors and modern medicine, but at the same time they believe that there is metaphysical power that is the real cause for all the biological symptoms (Solaim & Loewenthal, 2010). The root of this belief stems from the Islamic belief of Qadar, which is the belief that everything that happens to the

people is the result of God's will. Muslims believe that one should accept what God chooses for us, including illness; but they also they believe that they can seek treatment for cure (Kizilhan, 2014).

Evil eye is another belief that has a big impact on the Muslim's daily life (Solaim & Loewenthal, 2010). Muslims perceive the evil eye as something caused by a person who is not citing the name of God when he is admiring something from another person. Mentioning the name of God will prevent the negative effect of evil eye. The admired thing can be materialistic, or a personal attribute. To cast out an evil eye can be done by visualizing the target person. Evil eye is the most influential perception of the causes of the illnesses because it was mentioned by prophet Muhammed (Solaim & Loewenthal). In the Hadith of the Prophet (peace and blessings of Allah be upon him), *saheeh* (which means the most authentic saying from prophet Muhammed), it says that "One third of those who are in the grave are there because of the evil eye" (Bukhari). Because of this Hadith, many Muslims go to the traditional healers to cure them from evil eyes if they do not find a cure from medical doctors (Solaim & Loewenthal).

Talking or opening dialogues about a member of the family who has cancer is not welcome in Muslim cultures. Many cultural reasons explain this. One is the fact that cancer is thought to have no cure, it is a deadly disease that places the family in a horrifying position, with the anxiety that they might lose their loved one. Also, the belief that cancer is hereditary makes it harder on the family and on their children. They will not talk about it because they do not want their children to worry about their own health. For example, one Muslim patient stated that she did not know that her grandmother died

with breast cancer until she discovered that she had breast cancer, and then her mother told her (Vahabi & Lofters, 2016).

Beliefs about Cervical Cancer Screening

There are several Islamic beliefs that may impact how Muslim women think about CC screening. Knowing the cause of cervical cancer is a sensitive topic, especially in the Islamic culture, which is very conservative regarding any sexual behavior outside marriage. Muslim women want to think that they are immune because they have been faithful to their partners. However, this only lowers the risk of getting the infection, and does not make them immune (Vahabi & Lofters, 2016). Fear of bringing stigma and shame to the family also keeps women away from a cervical cancer screening. Also, talking about any female reproductive organ is taboo and not discussed openly. Some Muslim women will have some issues in their sex life, but it is not a subject to talk about even with a healthcare provider because of the importance of modesty (Vahabi & Lofters, 2016).

Another barrier to cervical cancer screenings in Islamic cultures is lack of knowledge (Vahabi & Lofters, 2016). An exploratory mixed method design was done on Ontario, Canada to explore women immigrants' beliefs about cervical cancer screening and HPV vaccination. The results revealed that many did not know about Pap smears and the HPV vaccine, and they did not know the reason for doing them. Also, healthcare providers did not mention them to the patients, and they do not seek any help until they recognize some symptoms (Vahabi & Lofters).

One important barrier is that some women think that because the HPV vaccine is administered at a young age it would normalize sex at that age (Vahabi & Lofters, 2016).

If the HPV vaccine is given at age 12, it is thought to be too early for girls to be engaged in talks about sexuality. Female Genitalia Mutilation (FGM) is another barrier among many Muslim communities, especially in African countries such as Somalia. They are so ashamed of what their mothers did for them, they do not want any healthcare providers to see them, especially if they live in Western countries (Salad, Verdonk, Boer & Abma, 2015).

Another barrier to screening can be embarrassment. For example, an unmarried woman does not want anybody to know she is sexually active. A qualitative study of Muslim women in London was done to explore the attitude about cervical cancer screening among Muslim women in London, England. One of the group stated, "I think embarrassment is quite an important issue for a lot of women, especially those who are not married and the young ones as well" (Szarewski, Cadman, Barr & Waller, 2009, p.195). Likewise, these researchers observed that cervical cancer screening could raise sensitive matters of trust and fidelity within marriages.

Theoretical Framework

Theory of Reasoned Action

A theoretical model is an important component in research, because it is the foundation that can guide scholars to identify what concepts are important, what these concepts are like, and how they may be related to each other. They shape what research questions are asked, and then influence how the findings are interpreted. The Theory of Reasoned Action (TRA) is a very common model that is used in vaccination behavior literature and will guide this study.

History of the TRA

In the 1960s, Martin Fishbein, a social psychologist at the University of Illinois at Urbana, proposed a theory about how beliefs may predict behavior. Co-authored with his graduate student Icek Ajzen, Fishbein released a book called *"Belief, Attitude, Intention and Behavior"* where the theory of reasoned action (TRA) was introduced (Fishbein & Ajzen, 1975). In 1980, Ajzen and Fishbein wrote another book about understanding attitudes and predicting social behavior, which described TRA and the application of this theory in many fields. Since 1980, the TRA has become very popular among researchers. This theory has frequently been used to understand health behaviors, such as condom use, physical activity, and others, as well as to develop interventions for these behaviors (Geshnizjani1, Jozkowski & Middlestadt, 2013). Also, TRA was used in the field of consumer behavior to predict consumer intentions and behavior, as TRA offers insight about when and how the behavioral change occurs (Sheppard, Hartwick & Warshaw, 1988).

Subsequently, a revised version of TRA has emerged; it is the Theory of Planned Behavior (TPB) (Ajzen, 1988). A meta-analysis examined the predictive ability of the TRA, and the result was that TRA has a very strong ability to predict behavior (Sheppard, Hartwick & Warshaw, 1988). According to Fishbein and Ajzen, "a behavioral intention measure will predict the performance of any voluntary act, unless intent changes prior to performance or unless the intention measure does not correspond to the behavioral criterion in terms of action, target, context, time-frame and/or specificity." (Fishbein & Ajzen, 1975). TRA, however, did not function well to explain behavior for the people

who had little power over their behaviors. Ajzen, therefore, added a new component to TRA which is the concept of perceived behavioral control (Ajzen, 1988).

With this new component, TRA became the Theory of Planned Behavior. TPB is considered an extension of the Theory of Reasoned Action and it has been used in the healthcare field to predict behaviors since 1988. The Theory of Planned Behavior holds that attitudes and subjective norms affect behavior indirectly through intentions (Ajzen, 1988). The difference between the two models is that TRA is suited for when understanding the individual who has the power to control the behavior. In contrast, TPB is applicable to individuals who do not have control regarding the behavior (Ajzen, 1988).

Concepts of the Theory

The components of the theory include the constructs of attitude toward the behavior, subjective norms, behavioral intention, and outcome behavior. How these four concepts are related is depicted in the following diagram (see Figure 1).

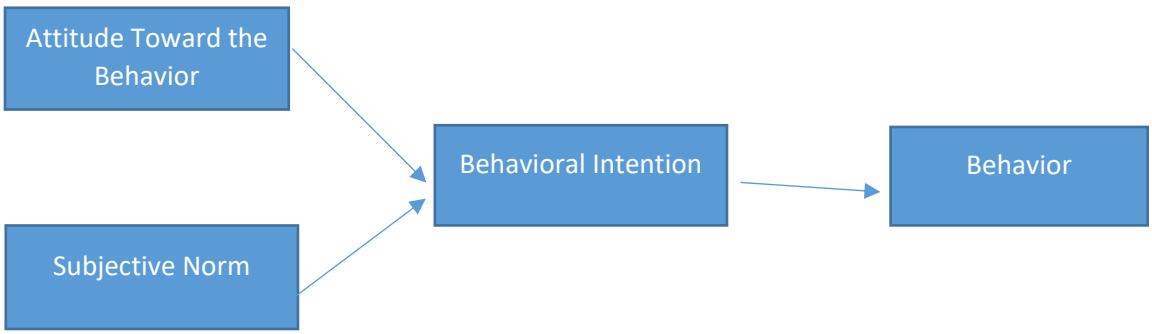

Figure 1. Theory of Reasoned Action Concepts. As this diagram depicts, the arrows show how attitudes and subjective norms contribute to, or influence, behavioral intention; intentions then influence behavior. Each of these concepts will be explained further.

According to TRA and TPB, the most important predictor of a behavior is the individual's ***intention*** to do the behavior (Fishbein & Ajzen, 1975). The behavioral intention is the individual's willingness to perform the behavior (Fishbean & Ajzek, 1972). An intention, such as "I intend to eat an oil-free diet for 1 month," is the intellectual willingness to perform or not perform the behavior.

The second construct is ***attitude.*** Although the definitions of attitude vary among researchers, as Allport (1968) pointed out, the concept of attitude "is probably the most distinctive and indispensable concept in contemporary American social psychology" (p. 593). However, most of the scholars agree attitude is defined as the general evaluation or the willingness to favor or not favor a specific attribute (Fishbean & Ajzek, 1972). A very important component of attitude is a concept of ***behavioral beliefs***, which is the individual's perceptions about intending to perform a behavior when individuals evaluate this specific behavior positively. For example, the more the individual believes that a certain behavior will maintain positive outcomes and prevent negative outcomes, the more likely it is that the individual will have a positive attitude toward the behavior. Attitudes are determined by the individual's beliefs about the consequences of doing the behavior (behavioral beliefs). A good example of an attitude is the individual's belief that changing to an oil-free diet will make the individual healthier.

Subjective norms refer to the impact of the individual's surroundings on the behavior (Fishbean & Ajzek, 1973). That is, the individual's friends, family, and co-workers will have an influence on the individual's decisions regarding any behavior. Regarding the previous example about the oil free diet, if the surrounding people of the individual believe that it is healthy and all of them support the individual to do this diet,

the individual will be more likely to start the oil-free diet. Another example is provided when considering the fasting during Ramadan. Muslims believe that fasting for one month will make them healthier by clearing the waste in their body. If all the people around them, including their family and friends, have the same belief, they will fast.

The theory recognizes that ***attitudes*** and ***subjective norms*** are the underlying contributors to the ***behavioral intention*** that will lead to behaviors. Consider the cancer related-behaviors of eating healthy food, avoiding smoking, and cancer screening; the more the individual believes that those behaviors will protect him/her against cancer and the more subjective norms (social pressure) apply pressure in favor of the behavior, the greater the individual's intention to perform the behavior. For another example illustrating how to apply the TRC, consider what prompts persons to take diet pills to lose weight. Given the model addresses only the behaviors that are under the individual's control, it will only predict the intention of the behavior (e.g., the individual's willingness to take the pills) (Sheppard, Hartwick & Warshaw, 1988). Thus, the model provides a framework to guide the whether an individual will take the pills, but will not predict the physiologic outcome of whether that the individual will lose weight.

Evidence Generated by the Theory

The theories of TRA and TPB were originally used to identify the underlying causes that influence individuals' intentions to engage in programs that will have a positive impact on disease prevention (Fishein & Ajzen, 2010). Likewise, TPB theory was frequently used to understand health behaviors, such as condom use, physical activity, and others, as well as to develop interventions for these behaviors (Geshnizjani1, Jozkowski & Middlestadt, 2013). Two meta-analyses used to investigate the validity of

the TRA. The meta-analysis included all the studies, whether behavioral or from other fields, that dealt with TRA that were published in *the journals of Consumer Research, the Journal of Marketing, the Journal of Marketing Research, Advances in Consumer Research, the Journal of Personality and Social Psychology, the Journal of Experimental Social Psychology, the Journal of Social Psychology, the Journal of Applied Social Psychology,* and *the Journal of Applied Psychology*. The first hypothesis of the study stated that there would be a significant relationship between peoples' intentions and performance. The statistical tests reported a correlation of 0.53 based on 87 studies with a total sample of 11,566 ($p = 0.01$). The other hypothesis stated that there would be a significant and substantial relationship between people's attitudes and subjective norms and their intentions. The correlation obtained was 0.66 and based on 87 separate studies with a total sample of 12,624 ($p = 0.001$). The result indicates that TRA provides an effective framework for thinking about how to predict behaviors.

The predictive validity of the TRA has also been examined by the founders of the theory, Ajzen and Fishbein (1973), who reviewed 10 studies which have been previously assisted in the research for at least three quantitative reviews. The results showed strong correlations between behavior and intentions ($r= 0.63$) and intentions and both attitudes and norms ($r= 0.76$). These studies significantly validated TRA as a useful model for predicting behavior (Albarracin, Johnson, Fishbein & Muellerleile, 2001).

The theory of reasoned action has been used in many studies that investigate Muslim behavior (Hussain, Rahman, Zaher, & Saleem, 2016). One of the studies examined Muslim consumers' perceptions to purchase Halal products. The theory investigated the religious factors, the consumers attitudes, and their intentions to buy Halal food products.

The survey included questions to measure the consumers' purchase intention and behavior regarding Halal products. The study revealed that all factors positively influence consumers' attitude and purchase intention of Halal food, and, then, their purchase behavior (Hussain, Rahman, Zaher, & Saleem, 2016). Echchabi and Olaniyi (2012) conducted a study in Malaysia about the factors that influence the intention to adopt the Islamic banking facilities. The authors used TRA theory, and the result showed that both attitudes and subjective norms have a positive influence on the intention to use the Islamic banking facilities. The TRA is a useful theory for the study because it identifies the potential impact of Islamic norms.

Applying the TRA to the Present Study

The author examined how the concepts used in the TRA can guide the study of how attitudes and subjective norms would influence intentions of Saudi nurses to provide a specific type of care. The attitudes (which include or reflect or are influenced by behavioral beliefs) and subjective norms will predict the behavioral intentions, which will lead to the behavior. The attitudes toward the CC screening and prevention behavior in this study will be assessed by examining the nurses' beliefs about cervical cancer screening and HPV infection and vaccination. It is assumed that if nurses have positive attitudes about the importance of the Pap test and HPV vaccine, they will provide patients with the knowledge about the importance of cervical cancer screenings. Subjective norms are important factors that affect decisions regarding any health issue. These norms include behavioral and cultural trends that affect personal decision-making when implementing cervical cancer screenings.

In this study, there are several subjective norms to consider. Muslim women experience challenges to access cervical cancer and HPV screenings. For example, Muslim women are less informed about cervical cancer screening tests, putting them at a higher risk of advanced cervical cancer. Studies exploring perceptions of CC screening among Muslim women have drawn attention to many factors affecting their decisions such as religion and culture.

Many obstacles affect Muslim women decisions about being screened for cervical cancer. Some of these obstacles include their religious beliefs about modesty, sexuality, and premarital virginity (Vahabi & Lofters, 2016). For example, Muslim mores about modesty dictate women keep their bodies except their faces covered; exposing private parts of the body is extremely uncomfortable and should follow dictates about to whom and how these breaches to modesty should occur (Mujallad & Taylor, 2016). Also, subjective norms in this theory means the opinions of the surroundings people and beliefs about the behavior. In the context of this study, Saudi Arabia being a male-dominant society, requires that a male guardian, whether the father or the husband, be heavily involved in the decision regarding any woman's health. Knowing that cervical cancer is caused by sexually transmitted disease would make it difficult for women to receive the screening or get the HPV vaccine because of the sexual stigma. However, most Saudi women do not know the causes of cervical cancer and the importance of the screening. Not only the women, but also the healthcare providers, have a lack of knowledge regarding the cervical cancer screening. Those subjective norms will affect the decision about cervical cancer prevention among Saudi nurses. These subjective norms are

expected to influence their intention toward cervical cancer prevention, and then influence behaviors regarding providing CC screening and HPV vaccination.

The diagram (see Figure 2) below summarizes the application of the TRC to the present study. It shows how the attitudes and the subjective norms are expected to affect the intention to obtain cervical cancer screenings. This, in turn, will lead to the desired behavioral outcomes. Future behavior, the last element of the theory, will not be included during this study. If the results show that nurses have the intention to promote cervical cancer prevention methods then it will likely lead to the implementation of those methods in the future.

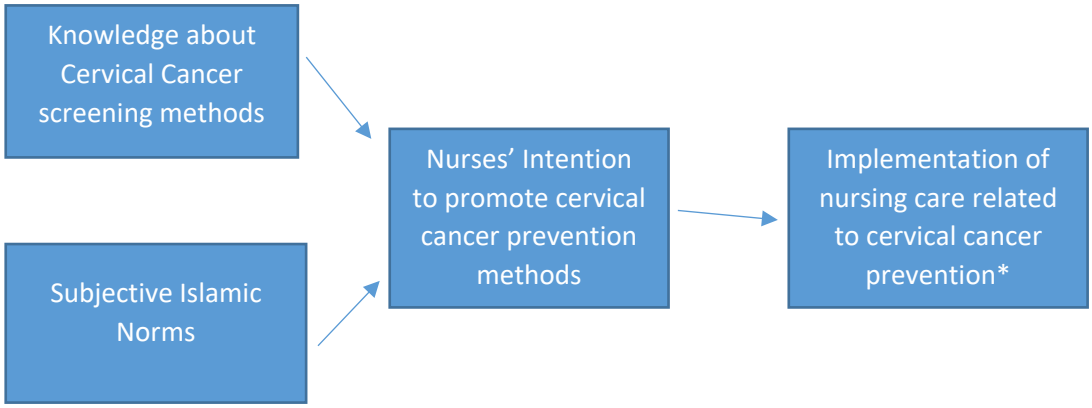

Figure 2. Application of Theory of Reasoned Action to the Present Study.

TRA is a useful theory for understanding how knowledge and attitudes, as well as subjective norms, may influence Saudi nurses' intentions to receive and provide interventions that screen and prevent cervical cancer. The literature indicates that there is no evidence for research in Saudi Arabia using TRA to gain an understanding of attitudes (beliefs or knowledge) about HPV vaccination and cervical cancer screening among Saudi nurses.

Chapter Summary

Cervical cancer prevention methods (pap smears and HPV vaccination) are the two effective ways to prevent cervical cancer and some type of HPV related diseases (Walden, 2013). Cervical cancer is the only cancer that can be controlled at a very early stage through its prevention methods (Kileo, Michael, Neke & Moshiro, 2015). In developed countries, cervical cancer mortality and morbidity rates have declined compared to third world countries. Many barriers affect people's decisions regarding the use of CC preventive methods such as lack of knowledge of CC and HPV, religious views, and healthcare system inaccessibility.

Religious and cultural beliefs have an impact on Muslims decisions regarding choosing healthcare services. Saudi lifestyle, decisions, and rituals are linked directly to Islam. Islamic roles regarding sex outside marriages prohibit this behavior and posit it is socially unacceptable (Smerecnik, 2010). The Theory of Reasoned Action was a good theory to address the nurses' knowledge, subjective norms (religio-cultural factors), and how these factors affect the nurses' intention to promote cervical cancer prevention methods.

CHAPTER THREE

STUDY METHODOLOGY

This study assessed Saudi nurses' knowledge and beliefs about Human Papilloma virus (HPV) infection, cervical cancer (CC), and its prevention through screening and vaccination. Also, nurses' intentions to educate the public about cervical cancer prevention methods were measured. This chapter describes how study aims were addressed using empirical methods. That is, the chapter explains how the sample was selected, and how data were collected and analyzed. The study collected quantitative data to provide numeric indications of nurses' knowledge and beliefs and attitudes; two open questions provided narrative information about the skills with which the nurses practiced.

Table 1. PHENOMENON OF INTEREST: Knowledge, Religious-Cultural Norms, and Behavioral Intentions Related to Cervical Cancer Prevention among Saudi Nurses.

Metaparadigm	**Person**	**Environment**	**Nursing**	**Health**
Theoretical TRA	Attitudes to cervical cancer prevention methods	Subjective Norms (religio-cultural factors)	Behavioral intention	Health promotion and disease prevention
Empirical	The survey items that assess the nurses' knowledge to about cervical cancer and its prevention	The survey items that assess how the religio-cultrual factors affect their decisions about cervical cancer prevention methods	The survey items that measure the nurses' intention to promote cervical cancer prevention methods	

Research Design

Across sectional, descriptive design using survey methods was used to generate descriptive and correlational theory. This study used mixed methods to address the research questions; that is, survey items obtained both quantitative and qualitative data. A mixed method design was used so that the researcher could approach the study aims from two philosophical positions. The quantitative piece helped the researcher to draw a mathematical conclusion about the phenomena, whereas the qualitative research allowed words to describe the problem. The qualitative questions allowed for collecting data without biasing the participant so much; it allowed a story or more descriptive perspective than numbers (Creswell, 2014). Qualitative methods allowed in-depth understanding of human experience from the perspective of the participants. A more complete understanding of the phenomenon were obtained when quantitative and qualitative data were merged.

A convergent (parallel or concurrent) mixed methods design was used (Johnson, Onwuegbuzie, & Turner, 2007). This approach aims to combine both the quantitative and qualitative research. This design allowed the researcher to collect and analyze the quantitative results, and combine the results with a qualitative individual or group interview data to have a complete picture of the problem by having the qualitative data to help explain in more detail the quantitative results. The procedure of the convergent design allowed for collecting the quantitative and qualitative data by a survey and merging these data during the analysis, or comparing the two types of data to provide an in-depth explanation of phenomena of study (Johnson, Onwuegbuzie, & Turner, 2007).

Research Aims, Questions, and Hypotheses

The purpose of this study was to assess the knowledge and attitudes about HPV infection, CC, and their prevention through screening and human papilloma virus vaccination. This study addressed the following aims and answer their corresponding researchable questions.

Aim 1

Identify how much Saudi nurses practicing in Saudi Arabia know about causes and prevention methods of cervical cancer among.

Research Question 1

To what extent do Saudi nurses practicing in Saudi Arabia have knowledge regarding causes and prevention of HPV infection and cervical cancer? **(knowledge)**

Hypothesis 1

There is a deficit in knowledge about the causes and prevention of CC among Saudi nurses.

Aim 2

Describe religio-cultural beliefs and practices that may be barriers to cervical cancer prevention methods include screening as well as vaccination.

Research Question 2

To what extent do Saudi nurses practicing in Saudi Arabia think Islamic religio-cultural norms impact Muslim women's cervical cancer screening, HPV vaccination, and health check-up behaviors? **(subjective norms)**

Hypothesis 2

Saudi nurses will strongly agree that Islamic religio-cultural norms influence the

health behaviors of obtaining a Pap smear and HPV vaccination.

Aim 3

Identify the strength of nurses' behavioral intentions toward cervical cancer prevention methods (i.e., their intent to provide nursing care that aims to prevent cervical cancer).

Research Question 3

To what extent do Saudi nurses intend to provide care aimed to prevent cervical cancer to patients/parents? **(intention)**

Hypothesis 3

Saudi nurses do not intend to discuss cervical cancer prevention methods with patients.

Aim 4

Explore how demographic and work-related variables are associated with knowledge and attitudes, subjective norms, and nurse intentions to promote cervical cancer prevention methods.

Research Question 4

How are demographic and work-related factors associated with knowledge and attitudes, perceived religio-cultural norms, and intention to promote cervical cancer screening and HPV vaccination? **(demographics)**

Hypothesis 4

Some demographic variables will be associated with the nurses' knowledge, subjective norms, and intentions about cervical cancer prevention; likely associated variables include region within KSA from which they come, religiosity, and age.

Setting, Sample, and Recruitment

This section will describe the setting where this researcher will obtain data, as well as the sample criteria and recruitment.

Setting

The study was conducted in an urban hospital in Jeddah City, in the Kingdom of Saudi Arabia—the King Fahad Armed Forces Hospital. Jeddah is considered the second largest city in Saudi Arabia. According to the Ministry of Hajj, the population of Jeddah is around 4 million (Abdullah, 2013). The population increased from 1 million in 1970 to 1.4 million in 1986, passing the 2 million mark in 1993 and dramatically increased in 2010, to 3.2 million (Abdullah, 2013). Due to the importance of this city, the large population, and the exposure of its citizens to many different cultures that share the same religion, I have chosen it for my study.

To understand the cultural and economic context of Jeddah, it is important to know it is located on the Red Sea and its port is considered one of the busiest ports in the world because Saudi Arabia is one of the world's largest oil producers (Federal Reserve Bank of St. Louis, 2016). It is also the city where pilgrims for the Hajj arrive. Hajj is the largest annual gathering in the world and it is a very important event for every Muslim. It is important because it is one of five "pillars", or obligations, of Islam. Jeddah yearly receives 3 million pilgrims who come perform Hajj (Ascoura, 2013). The duration of the Hajj is around 7 to 14 days, and involves a walking pilgrimage between the cities of Makkah and Medina (Reza et al., 2013). Thus, the Hajj season has an impact on the growing population of Jeddah because some of the pilgrims stay on illegally in Saudi Arabia and may work (Arab News, 2009).

Figure 3. The Map of Saudi Arabia

The researcher chose King Fahad Armed Forces Hospital (KFAFH) because it is one of the best public hospitals that cares for military patients. Although Saudi Arabia does not have women who serve in the army, their families are eligible to have the same services that are applied to the males in the military. The capacity of this hospital is around 400; in addition to the inpatient facilities, it also serves outpatients in a number of clinics.

Nursing in Saudi Arabia

The country of Saudi Arabia is experiencing issues with their health care system due to the insufficient number of Saudi nurses to meet the country's needs. This nursing shortage in Saudi Arabia is related to many reasons, including the life expectancy of the Saudi population, which has increased from age 69 in 1990 to age 76 in 2012. Also, the annual population growth rate in Saudi Arabia has increased by 2.5% each year from

1990 to 2012, and that will lead to excessive demand for healthcare (Alghamdi & Urden, 2016).

Furthermore, although the overall number of nurses who are working in Saudi Arabia is 140,389, only 51,350 are Saudi nurses. Thus, the representation of Saudi nurses among all the other registered nurses in Saudi Arabia is only 36.6%. Cultural beliefs have a big impact on the nursing profession in Saudi Arabia. Many Saudi families believe that nursing is an inappropriate profession for their daughters because they will be exposed to male patients. Such interaction between males and females is inappropriate in many Saudi families, given the importance of preserving modesty and gender segregation in Islam. Some nursing practices, such as taking care of the private (e.g. genital) areas, create a negative perception among conservative Muslims (Aboshaiqah, 2016). The poor image of nurses as maids who must follow the physician's orders is still visible and influences the decision making of the parents and children. Together, these issues lead to a nursing shortage in Saudi Arabia. The nursing profession is struggling in Saudi Arabia, and the public needs to be educated about nursing to be able to attract more Saudi citizens (Aboshaiqah, 2016).

Sample Criteria

All the female Saudi nurses who are working in the King Fahad Military Hospital in the city of Jeddah were invited to participate in the study (N=82). All of them share the same culture and religion because all will be Saudi Arabian citizens; given the government dictates all citizens must be Muslim, it is assumed that 100% will be Muslim.

The exclusion criteria are male Saudi nurses. They were excluded because cervical cancer is mainly a women's issue, and it would be inappropriate for a male nurse

to address. In addition, the issues around HPV transmission, screening, and vaccination are sensitive in the conservative country of Saudi Arabia. It is not recommended that male Saudi RNs ask some questions regarding the sexuality of a female Saudi. Only the licensed Saudi nurses were asked because the nurses' aides do not have a lot of communication with the patients. Non- Saudi nurses were not included in the study.

Sample Size

Power analysis was used to determine if it is a convenient sample size for the study. A power analysis was conducted determining that a minimum of 82 nurses was sufficient to detect a significant medium effect at power of 80%.

Recruitment Methods

An e-mail was sent to the director of education at the King Fahad Military Hospital to ask her for permission to conduct the survey. After the approval, the researcher asked the director to tell the staff that a researcher will come and conduct a study about a certain issue and their collaboration would help make a positive impact on our healthcare system. The nurses were notified by the head nurses of each department. A memo was given from the director of nurses to the head nurses regarding the study.

The researcher anticipated a few challenges to recruitment. First, the topic of the study dissuaded nurses from participating, given its sensitive nature. Thus, the researcher told the director that the study was about how nurses think about preventing cancer among women. The reason for this is to reduce any biases that would affect their participation. Another barrier to collecting data was the time required for the researcher access nurses working the different shifts and workload demands for the nurses. The researcher organized herself so that she visited every unit/clinic at each shift (or shift

change). A gift was given to each nurse when they have completed their responses to motivate them. A tube of hand cream from the US was a motivational gift for the Saudi nurses.

Measurement of Concepts

The survey was comprised of items that assess the nurses' knowledge and beliefs about CC and its prevention through screening and HPV vaccination, as well as personal demographics and religious and cultural influences on seeking healthcare. In addition, the nurses' intentions about cervical cancer prevention methods will be measured too (see Appendix A). The items of the survey were either pulled from other tools (adapted or used as they existed) or written by the investigator to reflect evidence reported in the literature. The survey will be comprised of four sections: demographic information; knowledge (or beliefs) about HPV infection and vaccination, and cervical cancer causes and screening; reasons for not getting the HPV vaccine or cervical cancer screening; and Islamic influences on seeking health screening. The process of instrument development was described for each of these sections. First, however, efforts to establish validity for these items were taken; these will be described next.

Think Aloud Pilot Study

Many steps were taken to validate the survey and to make sure that the study is valuable to the Saudi community. First, Think Aloud interviews were done while developing the survey items to see if the items elicited the intended type of response, and to provide a glimpse of what may be found. The Think Aloud method requires participants to verbalize their thoughts and opinions while they are reading each questionnaire item (Mccorry et al., 2013). It provides insight into the interpretation of the

questions.

In this study, the Saudi nurses provided their insight about the questionnaire items pertaining to all the questions in the tool. The tool consists of demographic and work-related factors, perceived religio-cultural norms variables, and knowledge regarding the causes of CC, Pap smears, and HPV vaccination. Seven expert Muslim Saudi nurses having at least a master's degree who lived and were raised in Saudi Arabia participated. They were asked to read the questions from the survey aloud in front of the researcher. They were also asked to give their opinion about the survey item. The Think Aloud protocol took place in one of the big hospitals in Saudi Arabia. For each interview, the researcher spent around 15 to 20 minutes discussing the items of the survey with the participant and exploring the general issue from the interviewee's perspective. The topic and the primary goal of the study were explained to each participant in the study. None of the participants allowed the researcher to audio record the interviews. Also, the participants were told that the information they were going to share would remain confidential and the access to this information was limited to the researcher and her mentor. Notes were taken during these interviews, that later were examined to identify themes and salient points.

From reading the notes that were taken, the researcher realized an important piece for the study. The survey originally had a lot of religious questions, but the participants agreed that most of these questions were not appropriate to ask in the Saudi Arabian culture. The findings, however, also indicated lack of knowledge regarding HPV infection and CC among Saudi RNs. These informants also identified how discussion between nurses and patients of such matters is sensitive. Barriers to CC screening, that

these experts proposed included fear of stigma and shame if CC was found, and embarrassment if evidence of pre-marital sexual activity is observed.

Content Validity Study

Second, item content validity indexes (CVI) were calculated to determine if the items that are in the questionnaire adequately represented the domain of content intended. There are many methods for establishing CVI that have been proposed, such as average experts' rating of each item in the tool, and using coefficient alpha to quantify the panel agreements of the items that are relevant (Polit & Beck, 2006). There are two ways to compute CVIs. The first way involves the content validity of individual (I-CVI) items, and the second involves the content validity of the overall scale (S-CVI).

The content validity index in this study was determined by surveying a panel of six nursing experts. All panel members were from Saudi Arabia, except one who was a Muslim nurse who had completed a lot of research about Muslim health. Panel members all possessed a good reputation for conducting research on Muslim health issues, especially in Saudi Arabia. They were asked to rate each item to see if it was relevant to Saudi nurses' knowledge and beliefs about cervical cancer prevention. The response options to rate the items were 1=*not relevant,* 2=*somewhat relevant,* 3=*quite relevant,* 4=*highly relevant.*

The responses from the panel gave the researcher the ability to decide which questions must be included in the survey. Computational procedures for the scale-level I-CVI were clarified by the ratings of the six experts. The Scale-CVI is defined as ''the proportion of items given a rating of quite/very relevant [i.e., rating of 3 or 4] by both raters involved'' (Polit & Beck, 2006, p. 491). The researcher made a table to make it

Table 2. The Ratings on a 40-Item Scale by Six Experts: Items Rated 3 or 4 on a 4-Point Relevance Scale.

Item	Expert 1 Hanadi	Expert 2 Hind	Expert 3 Mai	Expert 4 Roaa	Expert 5 Salman	Expert 6 Khadeja	Number in agreement	Item CVI
1	X	X	---	---	---	X	3	0.5
2	X	X	X	X	X	X	6	1.0
3	X	X	X	X	X	X	6	1.0
4	X	X	X	---	---	X	4	0.6
5	X	X	---	---	---	X	3	0.5
6	X	X	X	---	---	X	4	0.6
7	---	X	X	X	X	X	5	0.8
8	X	X	X	X	X	X	6	1.0
9	X	X	X	---	X	X	5	0.8
10	X	X	---	X	X	X	5	0.8
11	X	X	X	---	X	X	5	0.8
12	X	X	X	X	X	X	6	1.0
13	X	X	X	---	---	X	4	0.6
14	X	X	X	X	X	X	6	1.0
15	X	X	---	---	X	X	4	0.6
16	X	X	X	---	X	X	5	0.8
17	X	X	X	---	---	X	4	0.6
18	---	X	X	X	---	X	4	0.6
19	X	X	X	X	X	X	6	1.0
20	---	X	X	---	---	---	2	0.3
21	X	X	X	X	---	X	5	0.8
22	X	X	X	X	X	X	6	1.0
23	---	X	X	X	---	X	4	0.6
24	---	X	X	X	---	X	4	0.6
25	---	X	X	X	---	X	4	0.6
26	---	X	X	X	---	X	4	0.6
27	X	X	---	---	X	X	4	0.6
28	X	X	X	---	X	X	5	0.8
29	X	X	X	X	X	X	6	1.0
30	X	X	---	---	X	---	3	0.5
31	X	X	---	---	X	X	4	0.6
32	X	X	---	---	X	X	4	0.6
33	---	X	---	X	X	X	4	0.6
34	X	X	---	X	X	X	5	0.8
35	X	X	X	X	X	X	6	1.0
36	X	X	X	X	X	X	6	1.0
37	X	X	X	X	X	X	6	1.0
38	X	X	X	X	X	X	6	1.0
39	---	X	X	X	X	X	5	0.8
40	---	X	X	X	X	X	5	0.8

easier to choose which items got 3 or 4 to be in the survey. If most of the panelists chose 1 or 2, and the item got less than 0.78, they were excluded from the survey. Lynn's 1986 criteria, cited by Polit and Beck (2006), that there should a minimum I-CVI of .78 when

there are 6 to 10 experts was applied. The researcher therefore removed 18 items because their I-CVI were under 0.78. Most of the questions were questions about the causes of cervical cancer. The panel agreed that those questions were not measuring cervical cancer prevention. The table below shows computational procedures for the Item level CVI.

Measures

Measures of the following study concepts will be described: demographic and work-related factors, attitude about cervical cancer prevention methods, perceived religio-cultural norms about CC prevention methods, and intention to promote cervical cancer screening and HPV vaccination.

Demographic and Work-related Factors

Nurses' demographics include age, years of experience, level of education, nationality, and specialty. These questions were adopted from other tools that studied knowledge and attitudes regarding cervical cancer prevention methods among healthcare providers.

Beliefs about HPV Vaccination

Ten questions inquire about beliefs related to attitudes/beliefs about HPV vaccination. These items were obtained from a survey about cervical cancer awareness conducted in Saudi Arabia among nursing students (Alshaikh et al., 2014). The beliefs about HPV vaccine will be measured by these questions that ask to what degree a respondent agrees or disagrees about the effectiveness of the vaccine and the barriers to getting the vaccine. The response options are 5-point Likert-type scales, where 1 indicates *strongly agree* and 5 indicates *strongly disagree*. The questionnaire's internal reliability was supported with data from students at the Princess Nora School of Nursing.

(N=1258). Alshaikh, et al. found the 10-item scale to have acceptable internal reliability with a Cronbach's alpha of 0.82. The author of this study done a CVIs for these items, and she found that most of the items CVIs is 1.0, and some items are .8, which are all in the acceptable range.

Beliefs about Cervical Cancer Screening

The level of knowledge and beliefs concerning causes of cervical cancer and Pap tests for screening will be measured by examining the nurses' response to six Likert-type scale questions which ask about the importance of cervical cancer screening and the barriers to not doing a yearly Pap smear. The response options are 5-point Likert-type scales where 1 indicates *strongly agree* and 5 indicates *strongly disagree*. These six items were pulled from a survey study assessing cervical cancer awareness (Alshaikh et al., 2014). It was tested for face and content validity by a pilot study carried out with 20 students. The questionnaire reliability was evaluated for consistency and found to be good (Cronbach's alpha = 0.82) when the items were used in a large study of Saudi nursing students (Alshaikh et al).

Another 10 items about the causes of cervical cancer were developed by the researcher based on the literature about cervical cancer prevention methods and the investigator's personal knowledge of the culture. These questions address the causes for cervical cancer that the Saudi women might have, such as God's will (Jihan, et al., 2015). The response options are 5-point scales, where 1 indicates *strongly agree* and 5 indicates *strongly disagree.* The result of the CVI indicated that most of the items are 1.0, and some items are .8, which are all in the acceptable range.

Religious Influences on Health-seeking for Muslim Women

Another section of the questionnaire for this study was inquired about how Islam influences health behavior, specifically the behavior of seeking health care. These eight items were adopted from another survey that tested the Health Belief Model in a study about knowledge of and barriers regarding breast and cervical cancer screening among Muslim women (N=50) in the United States (Salman, 2012). The items were adapted for this study to assess Muslim respondents' illness perceptions and willingness to seek and use cervical cancer prevention methods. Although the items were originally designed with a "check all that apply" directive, for this study each item will have a Likert-type scale response option that measures how much they agree or disagree with the item. Initially, Salman did not validate these items, but exploratory factor analysis was conducted to reduce an unknown number of items to the most salient factor. Most of the items CVIs are 1.0, and only two are .8, which are all in the acceptable range.

Behavioral Intention

Saudi nurses' intentions to promote cervical cancer prevention via assessment and education among individuals was measured by examining the nurses' responses to a set of six questions which were developed by this research team. These items ask whether the respondent agrees/disagrees about many issues such as if the nurses should help to teach parents of adolescent girls about the HPV vaccine, or teach young adult women about the HPV vaccine. The survey response options are 5-point Likert type scales, where 1 indicates *strongly* agree and 5 indicates *strongly disagree.* The questions were tested for validation using a content validity index (CVI) from experts in the field of nursing, to check if the items that are in the questionnaire represent the domain of content

addressed by the questionnaire. The result shows that all these questions are valid to the study. Most of the items CVIs is 1.0, and only two are .8, which are all in the acceptable range.

Knowledge about HPV

The level of knowledge about HPV was measured by examining the nurses' responses to a set of questions which ask whether they know route of transmission of HPV and the complications of being infected with HPV. The survey includes six questions to measure the knowledge about HPV among Saudi nurses. The nurses could respond *yes*, *no*, or *I do not know*. These questions were adopted from another tool developed and used by (Alshaikh et al., 2014). It was tested for face and content validity by a pilot study carried out on 20 nursing students. The questionnaire's internal reliability was tested; the Cronbach's alpha was 0.82 (Alshaikh et al., 2014). These questions were analyzed by summing the number of correctly answered items.

Open Questions

The researcher added two open questions in the questionnaire to obtain further understanding about the phenomena. The first open question offers a small vignette about a nurse who suspected a patient has HPV infection from symptoms such as warts on the vulva. After the vignette, the nurses were asked about her intentions by asking how she would respond and care for such a patient.

The other open question is about religious influences on health seeking for Muslim women. The question, "Are there any other ways in which Islam makes a difference in your thinking about women's health care? What were these? Please write your ideas (very short answer) in the following spaces or on the back of this survey?"

This question was part from a questionnaire to inquire how Islam influences health behavior, specifically the behavior of seeking health care developed by (Salman, 2012).

Data Collection

Pencil-paper questionnaires were administered because the author wants to make sure that the nurses would do them, and also because the author was cognizant that Saudi nurses do not frequently check their emails (making an online survey a poor approach to data collection).

When the author was collecting the data from a group of nurses in a room together, then she stayed quietly to the side to receive their questions or completed surveys and give out the reward/incentives. That would reduce duplication. In addition, the researcher had reviewed all the questions before the participant left to check for duplicate entries and skipped questions. To collect the sample size that the author intended, she attended all change of shifts on all units during a 2-month time and invited nurses leaving the shift to participated in the study. An incentive was given to each participant to motivated them to participate in our study.

Human Subject Protection

Permission from the Institutional Review Board at Loma Linda University and King Fahad Military Hospital in Jeddah was obtained before distributing the questionnaires to the Saudi nurses. The author presented at each questionnaire distribution and explained to each participant that the questionnaire was anonymous and voluntary and that responses will be reported in aggregate, and that only members of the research team will be privy to the anonymized data. Consent forms were attached to the questionnaires. The topic and the primary goal of the study was explained to each

participant in the study. The finished questionnaires were kept in a confidential box that would be opened only by the author. This box has a digital key that no one would know the password of it, except the author.

Statistical Analysis

This section describes not only how the data were cleaned and managed via SPSS version, but also how the uni- and bi-variate statistical analyses were completed. Data were entered, cleaned, managed, and analyzed using SPSS version 22.

Data Management

To enter the quantitative data, a variable was created for each item, and each response option would require a numeric code. Each response option had a different numerical code, and these were documented in a code book. For example, the answers for *Strongly agree* were coded as 1 and *Strongly disagree* were going to be coded as 5. Missing variables were coded as 999.

Cleaning

The second step before doing any statistical analysis was cleaning the data to reduce any biases that could affect the results of the study. In SPSS, to check for errors or missing data, a frequency distribution was conducted on each of the variables. Next, the researcher checked to see if the data for each variable were distributed normally, and met the assumptions for inferential statistical analyses. There were two ways to check for the normality in SPSS: It could be done either visually or numerically. Each item was checked for normalcy both visually (via histograms) and numerically (via skewness). After normality was assessed, if data were not normally distributed, log transformation or re-clustering response options differently was producing normal distributions.

Analysis

Initially, demographic items and all scales (which will be summed and examined for internal reliability using Cronbach's alpha) was analyzed using univariate analysis, including measures of central tendency and frequencies. Next, bivariate analysis (e.g., Spearman correlation, independent samples t-tests or analyses of variance) was used to measure associations between various variables. Finally, the knowledge, subjective norms, and work settings were checked if they predict the nurses' intention to promote cervical cancer prevention methods was analyzed using linear regression to determine what variance any of these might contribute to the independent variable of intent to care (see Table 3).

Table 3. Analytical Strategies for each Research Question.

Research Question	Empirical Indicators	Statistical tests
To what extent do Saudi nurses practicing in Saudi Arabia have knowledge regarding causes and prevention of HPV infection and cervical cancer?	Knowledge About HPV items; Beliefs about CC Screening scale; Beliefs about HPV Vaccination scale	Frequencies and percentages for all items. Knowledge About HPV items will be aggregated and assigned a score for % of items answered correctly. Both Beliefs scales will be summed, and measures of central tendency will be used for analysis.
To what extent do Saudi nurses practicing in Saudi Arabia think Islamic religio-cultural norms impact Muslim women's cervical cancer screening, HPV vaccination, and health check-up behaviors?	Religious Influences on Health Seeking for Muslim Women scale.	Frequencies, percentages, and measures of central tendency for all items as well as summed items. After assessing internal consistency, items to be included in the scale will be determined. Then Religious Influences on Health Seeking for Muslim Women items will be aggregated and summed for further bivariate analysis.
To what extent do Saudi nurses intend to provide care aimed to prevent cervical cancer to patients/parents?	Behavioral Intention scale.	Frequencies, percentages, and measures of central tendency for all items. After reliability analysis, appropriate items of the scale will be summed and used for analysis.
How are demographic and work-related factors associated with attitudes, perceived religio-cultural norms, and intention to promote cervical cancer screening and HPV vaccination?	All study variables as identified above.	Bivariate analyses (e.g., correlation) will be performed to compare the demographic, work related factors with nurses' attitude, perceived religio-cultural norms, and nurses intention.
How are demographic and work-related factors, knowledge and attitudes, and perceived religio-cultural norms, associated with intention to promote cervical cancer screening and HPV vaccination?	All study variables as identified above.	After initial bivariate analysis to determine which variables are significantly correlated/associated with Behavioral Intention, these dependent variables will be analyzed using Multiple linear regression to determine how much variance they explain in the independent variable of Behavioral Intention. Creating dummy variables for non-categorical variables will be done.

Philosophical Assumptions

The philosophical view that primarily influences my study is positivism. Positivism drives my quantitative design which can be scientifically verified by logical or mathematical proof. Positivists believe that reality is objective, and we can use measures that are adopted from scientific methods and theories. For these reasons, I have chosen positivism. I want to know the truth about the phenomena using empirical means. I want to discover and describe the nurses' knowledge and beliefs regarding cervical cancer screening. Also, I want to know their intentions regarding cervical cancer screening. By using the positivist approach, I will know the answers to all my questions using a quantitative method. This tool will help me to draw a conclusion using surveys about the knowledge and attitudes about HPV infection, cervical cancer, and HPV vaccination among the Saudi nurses. Using positivism, this study will begin to explore the wider concern regarding this dearth of education by investigating the knowledge of those who are best positioned to provide the knowledge – Muslim nurses.

Assumptions of the Current Study

The current study was based on following assumptions:

1. Saudi women's decision making about CC screening and HPV vaccination are influenced by many cultural and religious factors.
2. The sexual mores of Saudi Arabian culture will affect Saudi nurses' knowledge, attitudes, skills, and intentions to provide such care.
3. Studies show that cervical cancer cases in Saudi Arabia are low compared with the rest of the world. In my opinion, the reason for this is that the majority of women are not informed about or given access to cervical cancer screening methods. Hence, CC

is underreported.

4. Health care providers in Saudi Arabia, like the general populace, do not have sufficient information about HPV infection, cervical cancer, and HPV vaccination.

Summary

This chapter describes the methods for a cross-sectional, descriptive study using survey methods. An Explanatory Sequential Mixed Method Design was used. The study collected data from nurses employed at an urban hospital in Jeddah City, in the Kingdom of Saudi Arabia. The survey questionnaire was comprised of items that assessed the nurses' knowledge and beliefs about CC and its prevention through screening and HPV vaccination, religious and cultural norms that pertain to seeking healthcare, nurses' intentions about cervical cancer prevention methods, as well as personal demographics. Data was entered, cleaned, managed, and analyzed using SPSS version 22. Uni- and bi-variate statistical analyses was completed.

These methods allowed the investigator to address the overall study aim of this study which is to assess the knowledge and beliefs about HPV infection, CC, and its prevention through screening and human papilloma virus vaccination among Saudi nurses. Also, the study examined the nurses' intention toward cervical cancer prevention methods. By learning what nurses—who typically are the frontline healthcare providers for women, know and believe, future training can be designed for them that will in turn benefit the women for whom they provide care. Furthermore, by studying Saudi nurse perspectives, we can understand how Saudi culture influences what they know and practice as nurses.

CHAPTER FOUR

RESULTS

Chapter Overview

The purpose of this chapter is to describe the findings of this research. First, a description of the participants of the study is provided. Findings are presented in response to the five research questions: (1) To what extent do Saudi nurses practicing in Saudi Arabia have knowledge regarding causes and prevention of HPV infection and cervical cancer? (2) To what extent do Saudi nurses practicing in Saudi Arabia think Islamic religio-cultural norms impact Muslim women's cervical cancer screening, HPV vaccination, and health check-up behaviors? **(**3) To what extent do Saudi nurses intend to provide care aimed to prevent cervical cancer to patients/parents? (4) How are demographic and work-related factors associated with knowledge and attitudes, perceived religio-cultural norms, and intention to promote cervical cancer screening and HPV vaccination? (5) How are demographic and work-related factors, knowledge and attitudes, and perceived religio-cultural norms associated with intention to promote cervical cancer screening and HPV vaccination? Before revealing study results, however, how the data were managed will be described.

Data Collection and Management

The data were collected over a period of three weeks, from January 20 to February 10, 2018. Data collection was finished within three weeks because the nursing director at the study site was extraordinarily supportive of the research. The nursing director instructed the head nurses of all departments to talk to their staff about the importance of being cooperative. Also, she was interested in the study and how the

results could have a positive impact on the nurses and women of Saudi Arabia. Particularly, this was the best time to introduce a sensitive topic to the public because the newly-crowned prince was calling for a modern Islam that will allow policy makers to implement policies to protect women's rights without any interference from male guardians.

Nurses were approached individually or in groups of two, and queried about participation in the study. The questionnaire was in a paper and pencil format, and it was in English. The first page of the questionnaire was the waiver of consent; that is, it was a letter to the participant explaining the study, how their responses would be confidential. Also, the contact information of the researcher was provided, in case the participants wanted to discuss the study with her. During the introductory comments make by the researcher, participants were told about the importance of answering all the questions. Some nurse participants returned their finished questionnaire directly to the researcher. The others put the questionnaires in a sealed box that no one could open except the researcher located in the nursing office. The data collection went smoothly; no issues were raised during the process.

The data were entered in the SPSS (version 22). As each response was entered, it was checked against that provided in the original questionnaire twice before it was entered into the software. No missing data existed for any of the quantitative items.

Given the responses to some of the items, data clustering was required. There were some questions which the response options for an item (i.e., variable) clustered together to reduce the skewness of the variable; this was done when there were small numbers of responses (<10% of the sample), and/or conceptual similarities or reason to

cluster the response options. Responses to the first question about the religious influence on work were clustered as: major and average (i.e., these two original categories were retained), and minor or no influence (i.e., the last two categories combined).

The responses to the nurse's work setting item were examined to determine whether it would be appropriate to cluster responses to this item by settings where cervical cancer screening and prevention were relevant or not. That is, for some analyses, it was thought that it might be best to use only the data obtained from nurses working in a primary care clinic (which included well baby clinics and family clinics), obstetrics (which included Obstetrics and Gynecology clinics or wards), and education (which included patient education and nursing education). Thus, these settings were clustered together, and the remaining settings were clustered. Bivariate analyses were run to compare if those in settings where cervical cancer screening and prevention would be important differed in their knowledge about and intentions to provide such care. Given intention to provide such care (the outcome variable) would only be appropriate to study among those in primary care, obstetrics and gynecology, pediatrics, and education, the regression analyses were run using the data only from nurses working in these settings—about half of the study sample. However, because there was no significant difference for intention to provide care between nurses in these pertinent settings and the nurses working in other settings, regression analyses were also completed with the entire sample, given the larger sample would provide more robustness.

There were three main variables in the study (intention, knowledge, and subjective norms). The Knowledge Scale was a quiz about cervical cancer prevention methods. The Knowledge Quiz incorrect and *I don't know* response options were also

clustered together. Thus, responses to items were considered correct or incorrect; the number of correct items were summed and then divided by total number of items (i.e., six) to compute a percentage, which then became the unit for analyses. This quiz included six multiple choice questions (with response choices being *yes, no,* and *I don't know*) to assess nurse knowledge about cervical cancer and HPV. To compute a score, or percentage of items answered correctly, the following steps were taken: the incorrect response options and the *I do not know* options were clustered together, as all were considered incorrect answers. (This was done by using the transform variable option in SPSS.) Next, the number of correct responses for each respondent were summed; this score was divided by six (the total number of questions) to compute the percentage. The variable used in further analyses was this percentage for the total number of correct answers. The Intention Scale included six items with the same Likert-type response options; thus, items scores were summed to compute a scale total. Also, the 6-item Subjective Norm Scale items were likewise summed.

In addition, all the summed scales (i.e., measuring intention, subjective norms, and knowledge) were checked to see if they met the assumptions for inferential statistical analyses. Normality was assessed by examining histograms that allowed visual inspection of normality for the three variables. Looking at the skewness and kurtosis of the variables showed them to be acceptable (between -2 and 2). The skewness for Subjective Norms Scale (i.e., .20) and Intentions Scale (i.e., -1.22) were within an acceptable range, so were not recoded.

Before conducting any bivariate analyses with these variables, the internal reliability for the three scales was evaluated. The internal reliability for each of the scales

described above ranged from poor for the Subjective Norms (Cronbach alpha = .524) to good for the Nurses' Intention (Cronbach alpha = .842). Table 4 provides the Cronbach's alpha for each scale.

Table 4. Reliability Statistics.

	Cronbach's Alpha	Standardized Cronbach's Alpha	N of Items	Minimum	Maximum	Mean	Std. Deviation
Intention Scale	.842	.850	6	6.00	30.00	24.4	5.26
Knowledge Scale	.577	.572	6	10.0	28.0	16.8	3.359
Subjective Norms Scale	.525	.527	6	5.00	17.0	11.9	2.99

Description of Sample

Study participants included 82 nurses from King Fahad Armed Forces Hospital in Jeddah, Saudi Arabia. All the Saudi female nurses and the female nursing educators who hold nursing degrees were included in the study. Only two nurses did not participate from the entire sample because they were on vacation (98% response rate). The analyses were run using the data from the 82 nurses. Power analysis calculated that the whole nurses of 82 will yield a power of 80%. Participants were offered hand sanitizers for their contributions to the study.

Demographics

Table 5 provides information about the sample demographics. The study participants' ages ranged from 21 to 54 years at the time of the data collection (*M* =

28.46, *SD* = 5.35), indicating a fairly young sample of nurses. The years of nursing experience ranged from 1 to 38 years (*M* = 4.15, *SD* = 5.06), likewise showing this was a

Table 5. Descriptive Statistics- Nurses' Sample Characteristics (82).

Variables	N	%
Setting		
ER	10	12.2%
PCC	18	22.0%
ICU	10	12.2%
Medical and Surgical	14	17.1%
OR	5	6.1%
Pediatric	7	8.5%
OB	7	8.5%
Education	7	8.5%
Other	4	4.9%
The Area from they grew		
Urban	77	93.9%
Suburban	2	2.4%
Rural	3	3.7%
Years of Experiences		
1-5	64	78%
6-10	15	18.2%
11-15	1	1.2%
16-20	0	0%
>20	1	2.4%
Level of Education		
Diploma	17	20.7%
BS	54	65.9%
Graduate	11	13.4%
Age		
21-25	30	36.6%
26-30	22	26.9%
31-35	25	30.5%
>35	5	6%
From whom the nurses take advice about the CC prevention methods		
Family Doctor	68	82.9%
Family	2	2.4%
Internet	3	3.7%
Self-decision	11	11%

sample of relatively inexperienced nurses. The educational degrees of the nurses also varied, but the majority (66%) had a bachelor's degree. Nurses' specialties were varied because it is one of the biggest hospitals in Saudi Arabia that has different specialties; the setting with the largest number of respondents was Primary Care, with 22% working in these clinics. Of importance to this study, given the topic which is pertinent to those working with teens and women, 17% worked in either a pediatric or obstetric setting. The nurse educators (8.5%) were also the same nurses who tended to have graduate degrees. These Saudi nurses were predominantly from an urban area (93.9%). Lastly, most of the nurses admit that they take advice about cervical cancer prevention methods from their family physicians (82.9%).

Addressing the Research Questions

Question 1: To What Extent do Saudi Nurses Practicing in Saudi Arabia have Knowledge Regarding Causes and Prevention of HPV Infection and Cervical Cancer?

The *Knowledge of HPV and CC Quiz* (subsequently to be referred to as the Knowledge Quiz) quantified nurses' knowledge regarding the cause and prevention of HPV and cervical cancer. The range of total correct varied from 0 to 6, the percentage of the correct responses for all participants was, on average, 43.9%; the averaged percentage of incorrect responses was 56.1%. The responses to the individual items, however, are presented in Table 6.

This quiz included six multiple choice questions (*yes, no, I don't know*) to assess nurse knowledge about cervical cancer and HPV. To compute a score, or percentage of items answered correctly, the following steps were taken: the incorrect response options and the *I do not know* options were clustered together, as all were considered incorrect

answers. (This was done by using the transform variable option in SPSS.) Next, the number of correct responses for each respondent were summed; this score was divided by six (the total number of questions) to compute the percentage. The variable used in further analyses was this percentage for the total number of correct answers.

Table 6. Percentage of the correct answers (N = 82).

	Frequency of nurses who answered item correctly	**Percentage**
Is Pap smear sensitive to detect early stages of cervical cancer?	57	70%
Is it sufficient to do a Pap smear once in life?	41	50%
Genital warts are caused by types of HPV?	29	35%
Which of the following diseases can be prevented by the vaccine against cervical cancer?	23	28%
The vaccine against cervical cancer contains which of the following viruses?	49	60%
What is the recommended age of vaccination against cervical cancer?	1	21%

Table 7. Statistics for the summed Knowledge Quiz questions.

Mean	**3.34**
Median	**3.50**
Mode	**4.00**
Std. Deviation	**1.79**
Range	**6.00**
Minimum	**0**
Maximum	**6.00**

Examination of the table reveals that the rate of correct responses ranged from nearly 21% (for Item 6) to 70% (Item 1), and the incorrect responses ranged from 30.5% (Item 1) to 79% (Item 6). All the six questions on the Knowledge Quiz asked about nurse knowledge regarding cervical cancer and HPV. The results show that the nurses have limited knowledge especially about the appropriate age to get the HPV vaccine (Item 6), the causes of genital warts and diseases that can be prevented by the vaccine against cervical cancer (i.e., Items 3 and 4 also showed a high percentage of incorrect responses). Thus, these data indicate the knowledge about CC prevention was moderately low among the nurses in this sample.

Table 8. Knowledge of HPV and CC Quiz (N=82).

Survey item responses	Frequency	Percentage
Is Pap smear sensitive to detect early stages of cervical cancer?		
Yes*	57	69.5%
No	4	4.9%
Do not know	21	25.6%
Is it sufficient to do a Pap smear once in life?		
Yes	23	28%
No*	41	50%
Do not know	18	22%
Genital warts are caused by types of HPV?		
Yes*	29	35.4%
No	5	6.1%
Do not know	48	58.5%
Which of the following diseases can be prevented by the vaccine against cervical cancer?		
Genital Warts*	23	28%
Ovarian Cancer	15	18.3%
Urinary Tract Infection	3	3.7%
Colon Cancer	1	1.2%
I do not know	40	48.7%
The vaccine against cervical cancer contains which of the following viruses?		
Herpes virus	1	1.2%
HPV*	49	59.8%
I do not know	32	39%
What is the recommended age of vaccination against cervical cancer?		
1-5 years	1	1.2%
12-25 years*	17	20.7%
25-50 years	37	45.1%
After 50	10	12.2%
I do not know	17	20.7%

*Denotes correct answers.

Question 2: To What Extent do Saudi Nurses Practicing in Saudi Arabia Think Islamic Religio-Cultural Norms Impact Muslim Women's Cervical Cancer Screening, HPV Vaccination, and Health Check-Up Behaviors?

To understand the religio-cultural norms, both quantitative and qualitative data were collected. The quantitative data were collected using three approaches. First, two items assessing nurse religious activities and how their religious beliefs influence their work were used; then six items measured opinions (or perspectives) about why Saudi women might not obtain HPV vaccination or a Pap smear. Additionally, a 6-item Subjective Norms scale was composed to measure aspects of Islamic influence on health behavior. In multivariate analysis, the Subjective Norms Scale was comprised of these 6 items only. The descriptive findings for each of these approaches to measuring religio-cultural (subjective) norms follows.

Nurse Religious-culturally Influenced Beliefs

Seven items obtained quantitative information about nurse perspectives about why Saudi women may not obtain HPV vaccination or a Pap smear. These items (with response options ranging from *strongly agree* to *strongly disagree* were summed, then divided by the number of items (i.e., 6). The scale total mean was 18.24 (SD = 3.47; range = 11-29). Thus, the item average for this sample was around 3, reflecting the response option *neither* (i.e., neither agreeing nor disagreeing). The lowest responses were to Items 6 and 7, which asked about whether the nurses have lack of knowledge regarding HPV vaccine and Pap smears. Also, there are some questions that asked about the effectivity and the side effect of the vaccine. The majority chose *strongly agree* or *agree*, indicating that they perceive a lack of knowledge affects nurses' perspectives

about cervical cancer prevention methods, and they are afraid of the side effects of the vaccine. Regarding the effectiveness of the vaccine, the majority chose *neither*, which may indicate that they do not know if they are effective or not. For further detail, read the results shown in Table 9.

Table 9. Saudi Nurses Opinions toward Cervical Cancer Prevention Methods: Measure of Central Tendency Statistics (N=82).

	Afraid of the side effects	Vaccine is not necessary	Vaccine is not effective	Vaccine could normalize sex	Vaccination causes infertility	Lack of knowledge of HPV vaccine	Lack of knowledge of Pap smears
Mean	2.51	2.85	3.38	3.24	3.40	1.46	1.39
Median	2.00	2.50	3.00	3.00	3.00	1.00	1.00
Mode	2.00	2.00	3.00	4.00	3.00	1.00	1.00
Std. Deviation	1.15	1.12	.87	1.08	1.00	.83	.64
Minimum	1.00	1.00	2.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	4.00

Religiosity

The two items measuring the strength of religiosity revealed nurses in this sample were quite religious, and this religiosity strongly influenced their work (see Tables 10 and 11).

Table 10. Spending times in practicing religious activities (N=82).

	Frequency	Percent	Cumulative Percent
More than 1	10	12.2	12.2
Daily	18	22.0	34.1
2 or more in a week	23	28.0	62.2
1 a week	16	19.5	81.7
Few in a month	11	13.4	95.1
Rarely	4	4.9	100

Table 11. Religious beliefs influence on work decisions (N=82).

	Frequency	Percent	Cumulative Percent
Major	40	48.8	49.4
Average	29	35.4	85.2
Minor	9	11.0	96.3
No	4	3.7	100.8

These findings indicate that religion played an important role in these nurses' lives. Around 85% of the participants believed their religion played either a *majo*r or *average* role in their work. However, only 34% spent time at least daily in religious activity.

Subjective Norms

The six questions about aspects of Islamic influence on health behavior (Table 12) with Likert-type scale response options allowed measurement of how much they agreed or disagreed with various pertinent religio-cultural norms. To compute the Subjective Norms total score, the items were summed, then divided by the number of items (i.e., 6). The scale total mean was 10.01 (SD = 2.63); responses ranged from 6-30. The majority of the participants chose *strongly agree* and *agree* to most of these questions, showing that they adhered to these norms—that is, they were conservative. More specifically, they agreed that the Islamic social norms (especially norms about sexual behaviors) had an impact on their decisions regarding use of healthcare services. Of note, 80% agreed that they will have shame and guilt if they get any sexually transmitted disease, and also they believed that all of what happened to them, whether bad or good, is God's will.

Table 12. Subjective Norms Scale: Descriptive findings (N = 82).

		Frequency	Percent	Cumulative Percent
Embarrassment about the breech of modesty required for screening	Strongly Agree	26	31.7	31.7
	Agree			
	Neither	32	39.0	70.7
	Disagree	22	26.8	97.6
	Strongly	2	2.4	100
	Disagree	0	0	0
Shame or guilt about having HPV and other sexual transmitted diseases	Strongly Agree	30	36.6	36.6
	Agree			
	Neither	36	43.9	80.5
	Disagree	9	11	91.5
	Strongly	6	7.3	98.8
	Disagree	1	1.2	100
Fear that a Pap smear will cause a loss of virginity	Strongly Agree	39	47.6	47.6
	Agree			
	Neither	31	37.8	85.4
	Disagree	10	12.2	97.6
	Strongly	2	2.4	100
	Disagree	0	0	100
The influence of a man in their family	Strongly Agree	22	26.8	26.8
	Agree			
	Neither	37	45.1	72.0
	Disagree	12	14.6	86.6
	Strongly	10	12.2	98.8
	Disagree	1	1.2	100
How a women's modesty will be respected during the procedure, especially when exposing part of the body	Strongly Agree	17	20.7	20.7
	Agree			
	Neither	36	43.9	64.6
	Disagree	23	28.0	92.7
	Strongly	5	6.1	98.8
	Disagree	1	1.2	100
Whatever happens is God's will	Strongly Agree	35	42.7	42.7
	Agree			
	Neither	29	35.4	78.0
	Disagree	8	9.8	87.8
	Strongly	9	11.0	98.8
	Disagree	1	1.2	100

Table 13. Subjective Norms Scale: Measure of Central Tendency Statistics (N=82).

	Embarr-assment	Shame or guilt about having STD	Fear to lose virginity	Influence of the man in the family	Modesty	God's will
Mean	2.00	1.92	1.69	2.15	2.23	1.92
Median	2.00	2.00	2.00	2.00	2.00	2.00
Mode	2.00	2.00	1.00	2.00	2.00	1.00
Std. Deviation	.831	.939	.780	.999	.893	1.03
Minimum	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	4.00	5.00	4.00	5.00	5.00	5.00

Qualitative Results Regarding the Religious-cultural Norms

Two open questions allowed the participants to write about the influence of religio-cultural norms on their practice. The first question presented a vignette regarding a woman with cervical cancer, and the nurses' psychosocial care toward the patient. Also, there was another broad open question about how their religious beliefs affected women obtaining cervical cancer prevention methods (i.e., vaccination, Pap smears).

Data analysis began with open coding, which involved highlighting themes line-by-line. Different highlighting colors for each recurring or salient theme were used. After the author finished with open coding for each of the open questions, she clustered similar or overlapping themes together (axial coding). To facilitate understanding, she created a table to make it easy to recognize the reason for grouping those codes together (see Tables 13-14).

The response rates for the qualitative questions were very low (38% of participants responded one or both questions). When looking at the response rates by

setting, no trends were observed for whether work settings were associated with responding or not (see Table 14).

Table 14. The Response Rates for the Qualitative Questions.

Settings	Number of nurses	Percentage
OR	3	3.7%
ICU	5	6%
PCC	7	8.5%
ER	3	3.7%
Mid/Surg	5	6%
Pediatric	3	3.7%
OB	3	3.7%
Education	2	2.4%
Total	31	38%

Themes

There were four major themes identified in the study: educate patients and provide information, emotional support from trusted others, nursing physical care, and religious beliefs about accessing healthcare. These themes are presented in Table 15 and 16 will illustrative quotes.

Theme 1: Educate Patients and Provide Information

All the participants identified that education is important so that patients can be provided with information about cervical cancer prevention methods. In addition, the participants explained how the healthcare providers have a significant responsibility to educate the public about the preventive methods of cervical cancer. It is important to know the factors that shape individuals' perceptions about cervical cancer. Some nurses provided information about the importance of education in Islam, and how Islam urges

everyone to seek education. One of the nurses mentioned that prophet Mohammed said, "seek knowledge even unto China." The nurses agreed that they want to know more about cervical cancer prevention methods to educate the public about them.

Theme 2: Emotional Support from Trusted Others

The participants underscored many valuable solutions to calm the patients if they are worried about the disease itself or about any negative judgments from their families. Protecting patients' confidentiality is very important regarding issues such as a sexually transmitted disease in Saudi Arabia. Numerus nurses agreed that they will not be judgmental, and they will always support the patient's right according to the hospital polices. On the other hand, there were a few nurses who wrote negative statements, such as "she is a bad person" because of the patient's relationship with a man other than her husband.

Theme 3: Nursing Physical Care

Only 16% of the nurses provided information about the physical care, and how to take care of the perineal area. They believed that hygiene is the first thing that the nurses must be provided to those patients. They identified that nurses should inform the patient of the importance of cleaning their perineal area, and to change their undergarments frequently.

Theme 4: Religious Beliefs about Access to Healthcare

It was observed that some participants' views toward cervical cancer came from the misperception that cervical cancer is considered a sexually transmitted disease and those women who are diagnosed are denigrated for religious and cultural reasons. In regard to cervical cancer prevention methods, some participants did not know the way of

transmission, so they asked for more education about CC from the education department at the hospital. The others, who knew that the cervical cancer is a sexually transmitted disease, responded that even though sex outside marriage is prohibited, caring about our bodies is very important. Some nurses were judgmental and wrote that affected women are "bad women." However, most of the nurses said it was not their job to judge anyone; their job was to comfort patients when they need it the most.

Some nurses wrote that it is very important to have a faith that guides people in their lives. As Muslims, they addressed that their faith prohibits any disrespect of a person's privacy. Also, one of the participants explained how spiritual and religious beliefs are important for her patients. They believe that God can perform miracles for people in need, and this helps to comfort them and their families. It is one kind of healing that can relieve stress and give hope to them. Stigma and shame can have negative outcomes on the patients. It is far worse if they do not have any hope. One participant said, "As a believer, I will try everything that she believes to comfort the patients."

Table 15. Open Question #1: What should a RN do for Hana?

Themes	Sub-themes	Illustrative data
Educate patients and provide information	• The importance of protected sex. • Inform that all will be confidential and need of short term treatment. • Seek help from other team members if needed more info; inform patients that information will be shared with medical team. • Teach that acceptance is first step to solving problem. • Educate to prevent transmission. • Poor education regarding STDs may have caused this problem • Educate her to "not see married person" (meaning not have sex outside of marriage). • Give info regarding the disease (how it is not life threatening, is cured) • That this could happen to anyone. • Up to patient if she wants to inform her parents.	"Educate the patient about the disease. Seek help from other team if the patient needs more explanation." "Improve communication with her"
Emotional support from healthcare providers	• Encourage questions provide privacy (e.g., won't share her info with family) except healthcare team. • Tell her not to be afraid; "we are here for you" Assure we will provide good care. • Communication with goal of encouraging self esteem ask her to take a deep breath • Seek to reduce shame, depression, anger.	"I can talk to Hana about the treatments and give her supportive talks." "Reassure the patient." "Give support to her, and I feel sorry for her." "Reassurance that everything will be confidential and need short term treatment."
Nursing physical care	• Take care about her underwear how to clean herself. • Manage her pain/itchiness; consult doctor for treatment. • Advise that her husband seek medical checkup	"Ask the patient to wash her genital area, apply prescribed medication, and educate the patient about proper hand hygiene." "I will tell her to take care of her private parts by washing every day."
Nurses perspectives regarding the patients	• Being judgmental • Being sympathetic	"I will keep my feelings away from her case" or "No private thoughts…" "I think she is not a good person" or "I think her husband is bad" or "she did something wrong, but does not mean she is a bad person" "She is probably having many sexual partners."

Table 16. Open Question #2: In general, how does Islam effect providing cervical cancer prevention?

Themes	Sub-themes	Illustrative data
"God gave us a brain"	• Islam urges us to protect our health • Islam's more against sex outside of marriage decreases CC incidence; likewise circumcision and having only 1 sexual partner • Although everything is God's will, we still need to look at the causes of illness	"If there is a way to protect our self, God would want us to present it. Our prophet peace be upon him told us to look for a treatment and cure it if we are sick, and vaccination is a part of the treatment so it must be considered." "Everything it is God's well, but we need to consider the causes of the problem." "Islam is not preventing us from doing check up for our bodies because it is a gift from God and we must take care of ourselves to prevent any disease." "Islam is originally urges us to pay attention for our health, so we have to do it"
Islam does not influence health behaviors	• "Religion is for my spirit, not my body" • Problem is not the religion (but lack of education)	"My body can be physically hurt if I didn't get vaccine or pap smear." "Mostly it is cultural not religious believes there is no relation between Islam and CC."

The qualitative and quantitative data validated each another. Both types of data indicated how religious beliefs influenced these nurses' care decisions. The quantitative data indicated that religious beliefs affect the Saudi nurses' decisions to promote cervical cancer prevention methods such as embarrassment, modesty, and shame about sexually transmitted disease. The qualitative data described in depth the nurses' perspectives on caring for a patient with a sexually transmitted disease and how religion influences this. Most of the nurses agreed that they want more education about cervical cancer, and they underscored that the Islamic religion urges every Muslim to seek treatment to live healthfully. The qualitative and quantitative data show how some nurses recognized that Islam does not prevent them from promoting cervical cancer prevention methods, but at the same time they said Muslim modesty and other factors can affect their decision to use cervical cancer prevention methods. This suggests that Islamic teaching advises every Muslim to protect their body from any harm; however, because cervical cancer often results from sexually transmitted diseases, people in the Muslim community sometimes feel uncomfortable discussing prevention methods.

Question 3: To What Extent do Saudi Nurses Intend to Provide Care Aimed to Prevent Cervical Cancer to Patients/Parents?

There were six items to measure the Saudi nurses' intention to provide care aimed to prevent cervical cancer to patients (i.e., Intention Scale). Most of the items were about educating the families and adolescents about the importance of HPV vaccine and Pap smear. Each item had a 5-point Likert type response option from *not at likely* to *very likely*. To compute an Intention to Provide Care total score, the items were summed. The scale total mean was 24.5 (SD = 5.26), and responses ranged from 6-30—indicating that

this sample had respondents who reported at each end of the possible scores (i.e., one participant who had no intention at all, and 18 nurses scored the highest possible). The mean showed that more participants had high intention to promote cervical cancer prevention methods. That is, the item average for this sample was around 4 (on a scale 1-5), suggesting fairly strong intention to provide CC prevention. The lowest responses were to Item 6, which asked about intent to query female patients about sexual activity. The mean for Item 6 was 3.3. For further detail, read the results shown in the Table 17.

Table 17. Intention Scale: Measure of Central Tendency Statistics (*N*=82).

	Teach Parents HPV	Teach Adolescents HPV	Tell females about Pap smears	Educate females about Pap smears	Ask females if they are regularly doing Pap smears	Ask female patients if she is sexually active	Intention scale total
Mean	4.12	4.24	4.41	4.34	4.03	3.31	24.47
Median	5.00	5.00	5.00	5.00	4.00	3.00	25.00
Mode	5.00	5.00	5.00	5.00	5.00	3.00	30.00
Std. Deviation	1.26	1.19	.980	1.04	1.11	1.39	5.26
Minimum	1.00	1.00	1.00	1.00	1.00	1.00	6.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	30.00

Question 4: How are demographic and work-related settings, knowledge and attitudes, and perceived religio-cultural norms, associated with intention to promote cervical cancer screening and HPV vaccination?

Analyses were done to identify what study variables were significantly associated with the central variables of knowledge, subjective cultural norms, and intention to

provide cervical cancer prevention-related care. Using Spearman rho correlational analyses (because the scale involved an ordinal level of measurement), the intention showed a weak, but significant correlation with knowledge (r = 0.23, p = .04). However, intention was not correlated with subjective cultural norms. Furthermore, cultural norms were not correlated with intentions or knowledge.

Table 18. Correlations.

			Subjective Norm	Knowledge	Intentions scale	Experience	Age
Spearman's rho	Subjective Norm	Correlation Coefficient	1.000	-.089	.046	-.176	-.135
		Sig. (2-tailed)	.	.429	.684	.113	.227
		N	82	82	82	82	82
	Knowledge	Correlation Coefficient	-.089	1.000	.248*	-.194	-.018
		Sig. (2-tailed)	.429	.	.025	.081	.873
		N	82	82	82	82	82
	Intention scale	Correlation Coefficient	.046	.248*	1.000	.162	.250
		Sig. (2-tailed)	.684	.025	.	.147	.023
		N	82	82	82	82	82
	experience	Correlation Coefficient	-.176	-.194	.162	1.000	.717**
		Sig. (2-tailed)	.113	.081	.147	.	.000
		N	82	82	82	82	82
	age	Correlation Coefficient	-.135	-.018	.250	.717**	1.000
		Sig. (2-tailed)	.227	.873	.023	.000	.
		N	82	82	82	82	82

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

ANOVA was used to explore the association between nurses' intentions with the categorical demographics variables. Results showed no associations between the nurses' intention and the demographic variables.

Table 19. ANOVA between intention and categorical demographic variables.

		Sum of Squares	df	Mean Square	F	Sig
Work setting*	Between Groups	3.543	1	.221	.88	.59
	Within Groups	15.32	76	.251		
	Total	18.872	77			
Level of Education (diploma, BA, Grad)	Between Groups	5.328	16	.333	.97	.50
	Within Groups	22.23	65	.342		
	Total	27.561	81			
Religious Activities**	Between Groups	38.65	2	19.33	.69	.50
	Within Groups	2205.8	79	27.92		
	Total	2244.4	81			
Religious Influence***	Between Groups	2.23	1	2.23	.07	.77
	Within Groups	2229.9	79	28.22		
	Total	2232.2	80			

*Work setting (OB, PCC, Education)
**Religious activities categorized as many, moderate, and rarely.
*** Religious influence categorized as influence and no influence.

After measuring the correlations and determining whether there were any associations between the major study variables, a multiple linear regression was used to test how the work setting, knowledge and the subjective norms predicted the intention to promote cervical cancer screening and HPV vaccination. When conducting the analysis, an Enter method was used. This means that all the independents variables are entered into the equation at the same time. It does not matter which variable is entered first. Results in Table 22 revealed that knowledge independently explained nursing intention (B = .397,

β=.314, t (76) = 2.814, $p > 0.05$). That is, for every 1 unit of increase in intention, knowledge increases .4, and only <1% of intention is explained by the three IVs (Knowledge, Work Settings, Subjective Norm). However, the work setting showed no significant contribution to the nurses' intention to promote cervical cancer prevention methods (B = -.295, β = -.027, t (76) = -.244, $p > 0.05$). Also, the subjective norms were not significantly predictive of the nurses' intention (B = -.073, β = -.034, t (76) = -.306, $p > 0.05$). The regression findings are presented in Table below.

Table 20. Model Fit Table

Model	R^2	R^2Adjusted	R^2Change	F Change	df (1,2)
1	0.098	0.062	0.098	2.69	3,74

Table 21. Model One and ANOVA.

Model		Sum of Squares	df	Mean Square	F	**Sig**
1	Regression	216.51	3	72.17	2.68	.041b
	Residual	1987.43	74	26.86		
	Total	2203.95	77			

a. Dependent Variable: Intention Scale
b. Predictors: (Constant), Work Setting, knowledge, Sub_Norm

Table 22. Coefficients.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	17.51	4.09		4.27	.000	9.341	25.673
	knowledge	.39	.14	.314	2.81	.006	.116	.678
	Sub_Norm	-.07	.238	-.034	-.306	.760	-.546	.401
	Work Setting	-.29	1.21	-.027	-.244	.808	-2.703	2.113

CHAPTER FIVE

DISCUSSION

Study Purpose and Chapter Overview

The purpose of this study was to assess Saudi nurses' knowledge and religio-cultural beliefs about Human Papilloma Virus (HPV) infection, cervical cancer (CC), and its prevention through screening and vaccination. Additionally, the nurses' intention to educate the public about cervical cancer prevention methods was measured. This chapter will discuss the main study findings and also the study strengths, limitations, implications for nursing practice, and finally, conclusions obtained from this study.

Participants Characteristics

The study participants included 82 nurses from King Fahad Armed Forces Hospital in Jeddah, Saudi Arabia. Only two nurses did not participate from the entire sample because they were on vacation (98% response rate). The demographics studied included age, year of experience, level of education, work settings, and the area where the nurses grew up. The results indicated that the nurses were young *(M* = 28.46), and they also, on average, had little experience working as a nurse (*M* = 4.15). This is not surprising because the nursing profession is new in Saudi Arabia. Now, Saudis are accepting that women can work in mixed gender environments and work night shifts.

During the last ten years (2005 – 2015), King Abdullah gave women many rights they did not have before. Mixing between genders was prohibited and many families did not allow their daughters to become nurses given the work necessitated interaction with male colleagues and male patients, and work during night shifts. In 2015, King Abdullah gave women the right to vote and to be in the Saudi Consultative Assembly, the

governing body for the nation. That gave women encouragement to speak up for their rights and to explain to the community how Islam is protecting their right to work in a mixed-gender environment. King Abdullah's successor, King Salman, continued his brother's work by letting women drive. His son, the crowned prince Mohammed bin Salman, stated in an interview on the television show *60 Minutes*, "that Islam does not prohibit mixing between genders, and women are half of our society, so we have to give them the right to participate equally." He also observed "that we should not let any cultural factors affect our decisions now because we want Saudi Arabia to grow like other industrial countries." (M. Salman, *60 Minutes*, March 19, 2018)

Regarding the educational level, the findings from this study showed that the majority (65.5 %) of the nurses have bachelor's degrees. In Saudi Arabia, there are three degrees offered by the nursing colleges. The diploma (which is only three years at school), the bachelors, and graduate degrees are similar to those in the USA. Unfortunately, data about the percentages of Saudi nurses' educational background is non-existent; thus, comparison with the findings from this study is impossible.

In addition, the results from this study indicated that 94% of nurses grew up in urban areas of Saudi Arabia. This was expected due to the cultural influences to work as nurses; that is, urban citizens are less conservative than the people who are in the rural areas. This is presumably especially true in Jeddah, which is a cosmopolitan city that is open to many cultures.

The work setting of this sample include 22%, who worked in a Primary Care Clinic. This small majority of the Saudi nurses in this sample presumably worked in this setting because it only involves working day shifts, not have any night shifts. (This would

accommodate nurses' families' preferences.) The most intriguing finding related to the work setting of these nurses was that there was no statistically significant difference in intention to provide CC preventative care between those who worked in settings where this would be appropriate and those who worked in settings where it would not be expected generally. The results indicated that nurses who should be doing this sort of care (i.e., those working in education, primary care, obstetrics and gynecology care settings) have is no more intention than nurses who work in the other settings such as emergency, ICU, medical, surgical, and OR.

Question 1. To what extent do Saudi nurses practicing in Saudi Arabia have knowledge regarding causes and prevention of HPV infection and cervical cancer?

There were two approaches to quantifying the nurses' knowledge. The first part was a 6-item quiz to test the nurses' knowledge regarding the causes and prevention of HPV infection and cervical cancer. The averaged percentage of correct responses was 43.9%. Conversely, the percentage of incorrect responses was 56.1%. The item that the received the highest percentage of correct responses was the question that asked if the Pap smears are sensitive to detect early stages of cervical cancer (69.5% responded correctly). However, the lowest score was generated by the question that asked about the recommended age of vaccination against cervical cancer; only 20.7% responded correctly to this item. The results showed controversial responses, the majority of the nurses knew that Pap smears can detect cervical cancer in early stages, but they did not know that vaccination must be given at a younger age before youth are sexually active.

The second approach consisted of seven items about the nurses' opinions about cervical cancer prevention methods; these items had 5-point Likert-type scale response

options ranging from *strongly agree* to *strongly disagree.* Items assessed opinions about whether fear of the side effects influenced decisions about whether to obtain a pap or vaccine, as well as opinions regarding whether the HPV vaccine is necessary, effective, normalizes sex, or causes infertility; items and lack of knowledge of Pap smears were thought to impact obtaining them. Most of the nurses agreed that they had a lack of knowledge regarding cervical cancer prevention methods (mean was 1.39). The item regarding whether the vaccine would normalize sex or not generated a mean of 3.2, meaning that most chose the *neither* option. This is presumably because Saudi women, even nurses, are not comfortable talking about sexual issues. It is considered a sensitive question because most of the Muslim women does not like to talk about any sexual behavior (Mujallad & Taylor, 2016).

Together, these results revealed gaps in these nurses' knowledge regarding cervical cancer. The findings from the study are consistent with another study about the knowledge of cervical cancer among women in Saudi Arabia (Malibari, 2018). This descriptive, cross-sectional study by Malibari involved the survey of 412 women in Saudi Arabia using some of the same items that were included in the questionnaire used in the present study. Malibari concluded that Saudi women have good knowledge regarding cervical cancer, but limited knowledge regarding Pap smears and HPV vaccination, and how this lack of knowledge is the main cause of cervical cancer.

This lack of knowledge among nurses and women in Saudi Arabia is likely because of the route of transmission of cervical cancer. Any sexually-transmitted disease is a taboo in Saudi Arabia (Ahl & Steinvorth, 2006). A taboo topic is, by its nature, not discussed opening in a society—and in this case, apparently not even in nursing school.

Question 2. To what extent do Saudi nurses practicing in Saudi Arabia think Islamic religio-cultural norms impact Muslim women's cervical cancer screening, HPV vaccination, and health check-up behaviors?

This question was answered by data obtained using quantitative and qualitative questions. The quantitative part consisted of six questions to measure what the nurses thought other women let influence their decision making about cervical cancer prevention methods. The results indicated that religion has a huge impact on the women' decision, especially when it comes to a sensitive topic such as cervical cancer, which is caused by sexually transmitted HPV.

To understand the religiosity of these nurses, approximately 85% of the nurses believed their religion played either a *majo*r or *average* role in their work, and 34% spent time at least daily in religious rituals. Given this, it is not surprising that most of the participants (78%) agreed that what happens to them (e.g., illness) is God's will. This belief could have a negative impact if that belief causes a woman to not seek any screening (i.e., not get the screening or vaccination because it is God's will if they get sick or not; it is their destiny). The belief, however, could also have a positive impact. That is, if they got cervical cancer, they would not be so depressed because they believe that everything from God is good for them. If they thank God for what happened to them, even if it is something bad, they believe that God will reward them more (Yazdani, 2003).

What is interesting about the cultural influence is that 45% of the participants agreed that the man of their family has an influence in the Saudi women' decisions regarding health services. This point is so critical to the women' health, because interference of their male guardians with their health could prevent them from doing their

annual checkups, especially cervical cancer prevention methods. Because HPV, which is the main cause of cervical cancer, is a sexually transmitted disease, it could be difficult to receive a male family member's permission for a Pap smear or HPV vaccination.

Modesty is one of the issues that Saudi women care about. Around 70% agreed that they were concerned about the embarrassment from the breech of modesty required for cervical cancer screening. Modesty is extremely important in Islamic life (Mujallad & Taylor, 2016). There are many verses in the Quran that prompt Muslims to be modest. Thus, healthcare providers must assure patients that their modesty will not breached, and they will have the choice if they want a male or female provider. There are many ways to show respect for the Muslim women's modesty such as ensuring privacy when the woman is not clothed fully. Always allow her to wear her *Hijab*, and never leave a

Response rates to the second open questions (about how to care for a patient with symptoms of a sexually transmitted disease, and about how religion influenced their thinking about women seeking healthcare in general) were low (37%). The low response rate for these qualitative items could be because the nurses were busy, so they did not pay attention to the open questions requiring hand writing responses. In addition, it might be because the questions contained content that is taboo and difficult or embarrassing for people in Saudi society to discuss.

Four themes were observed in the qualitative data: Patients education, emotional support from healthcare givers, nursing physical care, and religious beliefs influencing healthcare. The findings from the first theme about educating patients provided evidence that it is very consistent with many studies that show that Saudi women and the Saudi society need more awareness about the importance of cervical cancer prevention methods

(Alhamlan, Alqahtani & Al-ahdl, 2015). The lack of awareness about cervical cancer prevention methods will affect the morbidity and mortality rates because all the cervical cancer cases will be discovered in a very late stage in Saudi Arabia, which also requires more invasive treatment (Alhamlan, Alqahtani & Al-ahdl, 2015).

The second theme was "emotional support from trusted others." Many nurses agreed that the hypothetical patient in the vignette needed support and emotional comfort. Recognizing that the hypothetical patient could have gotten the infection from her husband or an extramarital relationship, these respondents never the less wanted to her privacy to be protected. Some of the nurses were judgmental and wrote that such patients are "bad people." The majority of the nurses wrote that they would follow the hospital's protocol of protecting the patient's privacy, and that they would discuss the case only with the responsible medical team.

The third theme identified the "nursing physical care" these nurses would provide. A few of the participants indicated that they would provide or educate Hana regarding the physical care and how hygiene is very important to prevent the spread of diseases. Although hygiene is important, it does not have any relation to preventing cervical cancer. Although it is uncertain exactly what these nurses believed, they either thought that hygiene would prevent spread of the disease, or it would help healing now the symptoms of the disease.

The last theme from the qualitative data recognized how religious beliefs influenced how patients sought healthcare. Some of the nurses said "I will keep my feelings away from her case" or "I think she is not a good person" The Saudi culture is closely intertwined with Islam; lifestyle, decisions, and rituals are directly reflect their

religion (Rafferty & Hibbert, 2015). Educating families and healthcare providers is not an easy task in their conservative communities where religious values and beliefs have a direct impact in their decision making. According to the Islamic teachings, if the individual is connected to God by praying and has a positive spiritual belief and trust, that is a powerful weapon for fighting illness and looking for a cure (Rashid, 2014). Because of their religious believes, it is very important to explain to the Muslim community how the education about cervical cancer prevention methods plays an important role in saving lives (Alsbih, 2014).

Question 3. To what extent do Saudi nurses intend to provide care aimed to prevent cervical cancer to patients/parents?

There were six items to assess the Saudi nurses' intention to provide care aimed to prevent cervical cancer (i.e., Intention Scale]. The items were about educating families and adolescents about the importance of HPV vaccinations and Pap smears. The scale total mean was 24.5 (SD = 5.26), and responses ranged from 6-30—indicating that the majority of the nurses are willing to educate females about cervical cancer prevention methods. The result is supported by many studies in the Western culture, that most nurses support providing education about prevention of human papillomavirus-related disease (Duval et al, 2009).

One item in this 6-item scale received notably different responses from the nurses in this sample. Most of the nurses would not agree to or hesitated to answer the item about asking female patients if they were sexually active or not. It was expected from the nurses that they do not agree about this question because of the conservative culture that they live in. The good thing is the mean was 3.32 out of 6 (3 indicating *not sure*). The

skewness was -.122 which met the normality assumption. This suggests that there is hope, especially due to the political situation now in Saudi Arabia. The people may be more open to discussing issues that were taboo before; then the society may accept changes that could benefit their citizens' overall health.

Question 4. How are demographic and work-related settings, knowledge and attitudes, and perceived religio-cultural norms, associated with intention to promote cervical cancer screening and HPV vaccination?

The purpose of this study was to examine how knowledge and subjective norms may influence Saudi nurses' intentions to provide interventions that screen and prevent cervical cancer. The analyses were done to assess if the nurses' intention to promote cervical cancer prevention methods would be affected by their knowledge, subjective norms, or their work settings. The result indicated that only the knowledge would affect the intention of nurses to promote cervical cancer screening and HPV vaccination. This significant finding is consistent with the Theory of Reasoned Action that the knowledge (which is an aspect of attitude) has an impact on behavioral intentions.

The subjective norms and the work setting did not explain their willingness to promote cervical cancer prevention methods. This negative finding is not consistent with TRA because subjective norms (i.e., the religio-cultural factors assessed in this study) should have had a significant impact on these women's intent to provide cervical cancer prevention. However, qualitative results countered the quantitative findings and suggest that many obstacles affect the Muslim woman's decision about being screened for cervical cancer. Some of these obstacles include their religious beliefs about modesty, sexuality, and premarital virginity (Vahabi & Lofters, 2016). Many female Muslim

healthcare providers are aware of the cervical cancer screening, but do not want to have the screening done by male physicians (Alali, et al., 2016). The scale used in this study had facets of subjective norms that others have not included, such as the influence of the man of the family, fear that a Pap smear will cause a loss of virginity, and whatever happens is God's well. As mentioned before, cervical cancer is a sensitive topic due to the route of its transmission, therefore it is not an easy for Saudi women to choose it.

Implications for Nursing

Practice

Now, however, is the best time to talk freely about the prevention methods for cervical cancer. People in Saudi Arabia are now more open to change the way they think so they can make a better society for their children. They know now that children are very smart, and they keep asking about many things that parents cannot hide anymore with all the technology and social media with which children are proficient. More awareness and knowledge about cervical cancer are needed right now.

If the study were repeated after five years, results regarding the subjective norms would likely be different. The culture surrounding nurses would by then likely be less judgmental, and religious views will be different due to the changes that are happening right now. Also, having a larger sample and stratified sampling from across the country will allow the researcher to have different opinions and views regarding the cervical cancer prevention methods.

What is interesting about this study is that it happened in a time when there was a major shift in politics that forced the religious leaders to be more lenient about the Islamic rules (source—other than 60 minutes). Now, the newly crowned prince,

Mohammed bin Salman, is calling for a "Moderate Islam." That will give the liberals more freedom of speech to talk about what was taboo before, to have a healthier community that cares about sexually related diseases. Now, Saudi women can attend marathon runs and drive cars, which they were not allowed to do before.

Education

Present study results show that there is limited knowledge regarding cervical cancer prevention methods. Yet findings from epidemiological studies show that there is increasing cervical cancer incidences in Saudi Arabia (see Chapter 1 and 2). The Saudi Health Ministry needs to recognize how important it is to educate the public about cervical cancer to reduce the mortality and morbidity rates among Saudi women. Because nurses are best situated to conduct this education, the faculties of nursing should start by educating the nursing students, so they will be ready when they work in the public and community health contexts to educate the women about cervical cancer prevention methods.

Present study findings show that even basic information about cervical cancer and its prevention need to be taught, such as whether Pap testing needs to be done regularly, whether genital warts are caused by HPV, and the recommended age for HPV vaccination.

Study findings also begin to support the need for teaching nurses' to appreciate their own and patients' cultural beliefs. Although Saudi nurses and patients share the same culture, and Saudi RNs understand why some patients are refusing to do Pap smears or getting HPV vaccinations, they may not understand how their religion supports CC prevention methods. That is, instead letting the conservatively religious Saudi Islamic

culture create an environment where talking about CC causes and prevention are taboo, nurse educators need to use Islamic directives for health promotion to educate nurses and the public about it. For example, there is a Hadith narrated by Usamah Bin Shareek (may Allah be pleased with him) that instructs Muslims to be proactive with their health:

> I was with the Prophet, and some Arabs came to him asking, "O Messenger of Allah, should we take medicines for any disease?' He said, "Yes, O You servants of Allah take medicine as Allah has not created a disease without creating a cure except for one." They asked which one. He replied, "Old age." (Sahih al-Bukhari)

Finally, the hospital-based nursing educators can provide more education to the staff about cervical cancer prevention methods. They must endeavor to give new classes for nurses to provide them with the knowledge that they need. In Saudi Arabia, most of the hospitals provide an orientation week for newly hired nurses. This week is designed to provide these new nurses with the knowledge that they need before they start working. It is like a refresher course about what they learned in nursing school. The educators generally give the nurses classes every day, and then text them next day. Each day different topics, such as medication calculation, the hospitals' policies, and general information, are covered. Knowledge about cervical cancer could be included in these classes. Also, ethics and respecting other religions and cultures, can be taught in the orientation week. Islamic ethics and cultural implications for nursing care such as CC prevention should be the topic—so teaching this to the non-Islamic nurses. But then for the Islamic RNs, they should be oriented to how their own religio-cultural mores influences the provision of CC prevention (and other sexually-related diseases).

In addition to using a lecture and test to teach, other pedagogical strategies can be used. For example, a booklet can be given to the new nurses about all this information as

well. Or during their annual evaluations, the nurses who have not taken any classes could be assessed and provided information as necessary. The educators can also create culturally relevant posters and flyers about Pap smears and HPV vaccinations, and then distribute these to all the nurses at the hospital. The educators could also include information about how cervical cancer is often discovered in late stages in Saudi Arabia. Such flyers would best be distributed in the Primary care clinics and Obstetrics and Gynecology departments. Whereas resources may be limited and offer only support for one educational flyer, it might be best if flyers could be developed separately for healthcare providers, women, and male guardians, as each of these populations would need a different type of content and/or psychological approach. Examples of content include: prevalence, mode of transmission, prevention strategies, common misbeliefs, and who is most susceptible. This education would need to be sensitively written so as to be respectful of Islamic culture which holds taboos about open discussions about sexuality. For instance, they can explain that women at the marriageable age are at risk for developing cervical cancer, so it will be obvious that they are sexually active, but inferring it in way respectful to the Islamic religion. Such attention to education for nurses, healthcare providers, and patients about CC prevention methods, will presumably have a positive behavior about CC prevention methods. Those responsible for such education, however, will do well to evaluate the efficacy of any teaching by implementing pre- and post-testing or other form of summative assessment.

Policy

Also, these data can inform the policy makers, who should try to make the vaccinations and Pap smears easily accessible to the women in Saudi Arabia. The policy

makers can follow the US recommendations for Pap smears which is done once every 3 years from age 21-30, then once every 5 years with HPV co-testing until age 65 (Salloum et al., 2014). Also, the policy makers will make the vaccination more accessible by providing HPV vaccines to people who desire the vaccine, whether for themselves or for their kids. Usually the policy makers in Saudi Arabia are working in the quality department in each hospital to ensure that everyone is following hospital policies and protecting the patients' rights. The people who are working in the quality departments are from different healthcare fields such as physicians, surgeons, nurses, laboratory technicians, and statisticians. The policy makers can include a Pap smear in the annual checkup for women as they need them. Nurses can tell women who refuse to have a Pap smear about the importance of receiving one. The technique a nurse can use to help a patient reconsider and make an informed decision may be to use what is called motivational interviewing; it is a counseling method to remove any fear or insecurities to find an internal motivation to change their behavior (Day, Gould, & Hazelby, 2017). For the HPV vaccination, because it is usually given in youth, they will need consent from parents until it becomes more acceptable in Saudi Arabia.

Theory

The study tested the elements of TRA in the Muslim community. The result supported the theory except the subjective norms element did not lead to the behavioral intention which is in this study is the Saudi nurses' intention to promote cervical cancer prevention. The reason of that it might be that the Saudi community is so conservative, and if we have done this study to other Muslim country it could be significant and support the theory.

Research

Other investigators could use this research instrument, which can help researchers to include this construct in their studies. They could add other variables that could be significant factors to spread awareness and education about cervical cancer prevention methods. These includes the accessibility and the availability of cervical cancer prevention methods in Saudi Arabia.

Study Strengths

The major strength of this study is that it offers a more in-depth examination of a sensitive topic in one of the most conservative countries in the Islamic world (Aljubran, 2010). Talking about any sexually transmitted disease in public is not acceptable in Saudi Arabia.

Another strength of this study is the 98% response rate. As most of the nurses participated in the study, there was no missing data except for responses to the qualitative items. Interestingly, many nurses expressed appreciation that the study opened their eyes to learn more about the topic to benefit themselves as females and the community around them.

By sampling nurses, this study also discovered where there is a gap in the process required for improving Saudi women's health, especially cervical cancer prevention. That is, nurses—who are pivotal in the process of educating society about health promotion and disease prevention, lack the knowledge that is necessary for them to be change agents.

Having these qualitative data strengthened the study by providing more detailed perspective about subjective norms. The nurses expressed their views about how Islam

does not prevent them from seeking any kinds of prevention to be healthy, and only some cultural views affect their decisions, not Islam. However, religion and culture are very integrated in Saudi Arabia. A *Hadith,* a statement by the prophet Muhammed, encourages Muslim to seek any kind treatment: "There is no disease that Allah has created, except that He also has created its remedy" (Bukhari). This quote indeed provides impetus for improving CC prevention in Saudi Arabia.

This study generated a valid and reliable scale for measuring the intention to provide CC prevention interventions, the Intention scale. Indeed, the CVI for this scale was high (.85), and the internal reliability alpha was good (0.82).

Limitations

Three study limitations weaken the findings from this study. First, the data were collected in only one hospital, which was in Jeddah. Jeddah is considered a multicultural city, and most of the people are educated, with more open cultures compared to the other cities in Saudi Arabia. If data had been collected in other areas of KSA, such as the more conservative southern area, different results for nurses' level of knowledge or intention to promote cervical cancer prevention might have been observed. Second, although the sample size was the whole population of working female Saudi nurses in the one hospital, the sample size is still too small for robust power. It is also impossible to generalize the results to represent all the Saudi nurses.

The researcher reflects regarding the work setting that turned not significant it might due to the small sample size. Finally, considerable data were missing for the responses to the open items; if all the nurses had answered these questions, the qualitative data and findings would have been stronger, and possibly different.

Cervical cancer is considered a major danger that affects women all over the world. Cervical cancer can be easily prevented and cured. However, the majority of cases in Saudi Arabia are discovered at a very late stage due to a lack of awareness of the cervical cancer prevention methods. The overarching purpose of this study was to examine the knowledge and subjective norms of Saudi RNs and how these variables affect these nurses' intention to promote cervical cancer prevention methods.

The result of this study showed that there was a statistically significant relationship between knowledge and nurses' intention, such that the more knowledge the nurse had, the greater her intention to provide care to prevent CC. However, there was not statistically significant relationship between subjective norms and the nurses' intention. These latter findings differed from what was expected from the theory. Although knowledge was a significant predictor which is consistent as the theory, the subjective norms were not significantly predictive of intention to provide CC preventive care, which is not consistent with TRA. The qualitative data supported the TRA theory that the religious beliefs (subjective norms) influenced the nurses' intentions to promote cervical cancer prevention. Many nurses agreed that Islam urged them to protect their body, and one of their responsibilities was to educate patients in this regard. The nurses wanted to be educated so as to provide the patients with knowledge that they needed about CC prevention methods.

In addition, the demographic variables (age, experience, work setting, level of education) were tested to see if there are any relationships between them and the nurses' intentions. The results revealed that there were not any significant relationships between any of the demographics variables and the nurses' intention to provide CC prevention.

That means that only the level of knowledge explained the degree of intention to provide CC prevention; the subjective norms and the work settings did not explain the nurses' intentions to provide CC prevention.

The study provides evidence that nurses have limited knowledge about cervical cancer prevention methods, but a deeper understanding of the subjective norms is needed to promote cervical cancer prevention methods. Future research is necessary to improve education and remove any obstacles to use cervical cancer prevention methods.

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APPENDIX A

QUESTIONNAIRE ITEMS

Survey on Cervical Cancer Prevention Methods

The purpose of this survey is to learn about the knowledge, attitudes, cultural and religious norms, and willingness of Saudi nurses to educate the women in the community about cervical cancer prevention methods.

Instructions

Please answer the following questions without asking your colleagues or searching on the internet. Circle or check the answers you think are best.

Demographics

1. In which setting do you work as a nurse? (If you work in more than one setting, choose the setting where you work the most.)

____ Emergency department

____ Outpatient clinic (e.g., walk-in clinic, day surgery, or physician's office)

____ Home health, hospice, or inpatient hospice or palliative care service

____ Intensive care (e.g., CCU)

____ Long-term care (e.g., rehabilitation)

____ Medical/surgical unit (e.g., oncology)

____ Operating room

____ Pediatric unit (including nursery, if not rotating throughout perinatal units)

____ Perinatal unit (e.g., L&D)

____ Psych/mental health care

____ School/department of nursing (college or university) or hospital education

____ Other community-based setting

____ Other, please describe:

_____

2. In what region in Saudi Arabia did you grow up?

____ Eastern Region

____ Western Region

____ South Region

____ Northern Region

____ Middle Region

3. Which of the following best describes the area from where you grew up?

____ Urban

____ Suburban

____ Rural

____ Other, please describe: _____

4. How many years have you worked as a nurse? ____ years

5. What is your highest educational degree in nursing?

____ Diploma

____ BS

____ Masters

____ Doctorate

6. What is your age in years? ____ years

7. How often do you spend time in private religious activities, such as meditation or reading holy books?

____ More than once a day

____ Daily

____ Two or more times a week

____ Once a week

____ A few times a month

____ Rarely or never

8. How much do your religious beliefs influence on your decisions at work?

____ Major influence

____ Average influence

____ Minor influence

____ No influence

9. Hana is a 35 years old, unmarried Saudi woman admitted to the Emergency Room for pain in her genital area. When you examine her, you notice that she has warts on the vulva. You suspect she had sexual intercourse even though she is not

married. Hana worried and requests that no one know about her case because of her desire for privacy. As a nurse, what will you say to Hana?

_____

_____

_____

_____

_____

_____

10. Have you ever heard about what causes cervical cancer?

a. Yes b. No

11. Is Pap smear sensitive to detect early stages of cervical cancer?

a. Yes b. No c. I don't know

12. Is it sufficient to do a Pap smear once in life?

a. Yes b. No c. I don't know

13. Genital warts (*condyloma accuminata)* are caused by types of HPV.

a. Yes b. No c. I don't know

14. Cervical cancer is uncommon in Saudi Arabia.

a. Yes b. No c. I don't know

15. HPV is an uncommon sexually-transmitted infection in Saudi Arabia.

a. Yes b. No c. I don't know

16. Which of the following diseases can be prevented by the vaccine against cervical cancer?

a. Genital warts
b. Ovarian cancer
c. Urinary Tract Infection
d. Colon cancer
e. I don't know

17. The vaccine against cervical cancer contains which of the following viruses?

a. Herpes Virus
b. Human Papilloma Virus (HPV)
c. Human Immunodeficiency Virus (HIV)

d. I don't know

18. What is the recommended age of vaccination against cervical cancer?

a. 1-5 years

b. 5-10 years

c. 12-25 years

d. 25-50 years

e. After 50 years

f. I don't know

How much to you agree that **the following may cause cervical cancer?**					
	1= Strongly agree	**2=Agree**	**3=Neither**	**4=Disagree**	**5=Strongly Disagree**
19. God's will					
20. Hereditary or genetic causes					
21. Sexual behaviors					

22. From whom will you take advice about whether to be vaccinated against cervical cancer?

a. Family doctor

b. Father

c. Friend

d. Internet

e. Mother

f. Self-decision

g. Sister/ Brother

How much do you agree that **the following are reasons for why Saudi Arabians do not get the vaccine against cervical cancer?**					
	1= Strongly agree	**2= Agree**	**3= Neither**	**4= Disagree**	**5= Strongly disagree**
23. Afraid of side effects of vaccine					

24. Vaccine is not necessary as cervical cancer is a rare disease					
25. Vaccine is not effective					
26. Getting the vaccination could normalize sex at a young age					
27. The vaccination causes infertility					
28. Lack of knowledge about vaccine against cervical cancer					

For which of the following reasons do you think Saudi Arabians do not usually have a regular Pap smear to screen for cervical cancer?					
	1= Strongly Agree	**2= Agree**	**3= Neither**	**4= Disagree**	**5= Strongly Disagree**
29. Embarrassment about the breech of modesty required for screening					
30. Shame or guilt about having HPV and other sexual transmitted diseases					
31. Lack of knowledge about the importance of cervical cancer screening					
32. Fear that a Pap smear will cause a loss of virginity					

How often do you think patients think of the following when they consider getting a health screening or checkup?					
	1= Strongly Agree	**2= Agree**	**3= Neither**	**4= Disagree**	**5= Strongly Disagree**
33.The influence of a man in their family (for example, husband, father, brother, or fiancé) in terms of what is allowed or not allowed in the Islamic religion.					

34.How a women's modesty will be respected during the procedure, especially when exposing part of the body					
35.Whatever happens is God's will					

36. Are there other ways in which Islam makes a difference in your thinking about providing cervical cancer prevention (e.g., vaccination, Pap smears) for women? Please write your ideas here.

_____

_____

_____

_____

_____

If you are in a clinical situation where information about cervical cancer prevention might be helpful to a patient (or her family), how likely is it that you would do the following?					
	1= Not at all likely	**2= Somewhat unlikely**	**3= Not sure**	**4= Somewhat likely**	**5= Very likely**
37. Teach parents of adolescent girls about the vaccine against cervical cancer					
38. Teach a young adult woman about the vaccine against cervical cancer, if she has not been vaccinated yet					
39. Tell married patients to ask their doctor for a Pap smear, if they don't already get one regularly					
40. Teach married female patients about the value of having a Pap smear, if they do not already get one regularly					

41. Ask a female patient if she is obtaining a regular Pap smear					
42. Ask a female patient if she is sexually active					