5-2009

Determining the Knowledge and Attitudes of 18- to 26-Year-Old Women Regarding Cervical Cancer, Human Papillomavirus, and the Human Papillomavirus Vaccine

Ashlee Cooper Holguin
Utah State University

DETERMINING THE KNOWLEDGE AND ATTITUDES OF 18- to 26-YEAR-OLD WOMEN REGARDING CERVICAL CANCER, HUMAN PAPILLOMAVIRUS, AND THE HUMAN PAPILLOMAVIRUS VACCINE

by

Ashlee Cooper Holguin

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Health, Physical Education and Recreation

Approved:

Phillip J. Waite, Ph.D. Major Professor	Matthew Flint, Ph.D. Committee Member
LuAnn Helms, Ph.D. Committee Member	Byron Burnham, Ed.D. Dean of Graduate Studies

UTAH STATE UNIVERSITY
Logan, Utah

2009

ABSTRACT

Determining the Knowledge and Attitudes of 18- to 26-Year-Old Women Regarding Cervical Cancer, Human Papillomavirus, and the Human Papillomavirus Vaccine

by

Ashlee Cooper Holguin, Master of Science

Utah State University, 2009

Major Professor: Phillip J. Waite, Ph.D.
Department: Health, Physical Education, and Recreation

This study applied the constructs of the health belief model (HBM) to assess women's knowledge and attitudes (i.e., perceived susceptibility, perceived severity, perceived benefits and perceived barriers) regarding cervical cancer, HPV, and the HPV vaccine and determine whether they predict women's intentions to receive the HPV vaccine. Women aged 18 to 26 years were surveyed from a convenience sample, and were primarily well-educated White women. Using Polytomous Universal Model (PLUM) ordinal regression, it was determined that the constructs of this model could not predict women's intentions of receiving the HPV vaccine.

(81 pages)

ACKNOWLEDGMENTS

This project has taught me some of the most important lessons in life. First, you cannot predict outcomes, even if you have a well thought out time line in front of you. Second, things do not always go as you want them to. Third, depending on other people sometimes turns out to be more overwhelming than you could ever imagine. Despite these lessons, the completion of this project itself is a huge accomplishment for me. It is necessary to thank all those who helped me get to this point.

Thank you to my professors, Dr. Phillip Waite and Dr. Matt Flint, for replying to my numerous emails and having patience with me. Thanks to LuAnn Helms, also for having patience and always providing good advice. Thanks to the Cache Valley Women's Center, USU Student Health and Wellness Center, and the Bear River Health Department, this research would not have been possible without your willingness to help.

Last, thanks to my family and friends, for the encouragement to finish this project and more importantly my degree. In addition, to my husband, Mark, for always pushing me to go in the right direction and listening even when he does not really want to. The strength from each of you has been much appreciated. Thank You!

Ashlee Cooper Holguin

CONTENTS

Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

According to the U.S. Cancer Statistics: 2003 Incidence and Mortality report, 11,820 women were diagnosed with cervical cancer in 2003, and 3,919 women died from the disease that same year (Centers for Disease Control and Prevention [CDC], 2007). The American Cancer Society (ACS, 2007) predicts that there will be about 11,150 new cases of invasive cervical cancer in the United States in 2007. Human papillomavirus (HPV), the most common sexually transmitted infection (STI) in the U.S. and worldwide (CDC, 2006; Denny-Smith, Bairan, & Page, 2006), is present in nearly 100% of women with cervical cancer and is considered to be the primary cause of cervical cancer (Sharpe, Brandt, & McCree, 2005).

Women at most risk for HPV infection are those who are aged 20-24 years, have had multiple sexual partners, or had their first sexual contact at a young age. Subsequently, women who smoke are at greater risk of contracting HPV infection than women who do not smoke (CDC, 2006).

Practicing safe sex, regular screening tests, and vaccination are the best ways to prevent the development of cervical cancer (Hayden, 2006). Acquiring knowledge about HPV and its role after an abnormal screening test can reduce the incidence and mortality related to cervical cancer and other cancers (Likes & Itano, 2003). Recent national surveys of women have found somewhat higher rates of HPV awareness in comparison to previous years, although the majority of women are still unaware of HPV and its link to

cervical cancer (Denny-Smith et al 2006; Friedman & Shepeard, 2006; Ingledue, Cottrell, & Bernard, 2004).

The American Academy of Pediatrics (AAP), CDC, and The American Academy of Family Physicians (AAFP) have stated the HPV vaccine, Gardasil, is now recommended for 11- to 12-year-old girls, but can be administered to girls as young as 9 years of age, and may prevent the development of HPV and cervical cancer (CDC, 2006). The vaccine is also recommended for 13- to 26-year-old females who have not yet received or completed the vaccination series (CDC).

Although knowledge is not a direct predictor of health behavior, health behavior theories posit that it is a distal factor (Tiro, Meissner, Kobrin, & Chollette, 2007). The Health Belief Model (HBM, 2002) posits that a person's intention to perform a given preventative behavior is influenced by one's knowledge of a disease threat and one's attitudes regarding that disease (Rosenstock, 1974). In particular, a person's attitudes regarding a particular disease threat involve one's perceptions regarding their individual susceptibility to the disease, the severity of the disease, the benefits of performing the preventative behavior and the barriers that may place constraints on performing the preventative behavior. To date, no theory-driven research has been conducted aimed at assessing 18- to 26-year-old Utah women's knowledge and attitudes toward cervical cancer, HPV, and the HPV vaccine. A clearer understanding of these factors may improve health professionals' ability to design interventions that are more effective at increasing vaccination rates.

Purpose of the Study

This study applied the constructs of the HBM to assess women's knowledge and attitudes (i.e., perceived susceptibility, perceived severity, perceived benefits and perceived barriers) regarding cervical cancer, HPV, and the HPV vaccine and determine whether they predict women's intentions to receive the HPV vaccine. The construct "cues to action" was excluded from this study, as the researcher is not interested in determining what cues women to action, but rather only determining their knowledge and attitudes. The sample was composed of 18- to 26-year-old women because this is the age when most women start to become sexually active. For the purpose of this study, pregnant women were not included simply because their opinions may differ from the rest of the population, because they are not recommended to receive the HPV vaccine, according to various sources (ACS, 2007; CDC, 2007).

Research Questions

The following research questions were addressed in this study:

1. How accurate is 18- to 26-year-old women's knowledge regarding cervical cancer, HPV, and the HPV vaccine?

2. Do 18- to 26-year-old women believe there are severe consequences to getting HPV and cervical cancer?

3. Do 18- to 26-year-old women believe they are susceptible to getting HPV and cervical cancer?

4. What do 18- to 26-year-old women perceive as barriers to obtaining the HPV vaccination?

5. What do 18- to 26-year-old women perceive as benefits to obtaining the HPV vaccination?

6. Do 18- to 26-year-old women's knowledge levels and attitudes (i.e., perceived susceptibility, perceived severity, perceived barriers, and perceived benefits) regarding HPV and cervical cancer predict their intention to receive the HPV vaccination?

Limitations

The following limitations existed within the study:

1. An assumption of this study was that participants would provide accurate, honest responses reflecting their knowledge, attitudes and perceptions when completing the self-report survey.

2. Study participants were volunteers, which may have produced slightly different results than if they were randomly selected from the target population.

Delimitations

The following delimitations exist within this study.

1. Only women aged 18-26 years old were allowed to participate in the study.
2. Pregnant women were excluded.
3. Regional data may not be representative of all Utah women.

Definition of Terms

Below is a list of terms defined for the purpose of this research study.

Perceived susceptibility: The degree to which an individual feels personally susceptible to contracting a condition (Bandura, 1986).

Perceived severity: The degree to which an individual values the condition as serious; through emotional arousal or consideration of the consequences of the condition (Bandura, 1986).

Perceived benefits: The degree to which an individual believes that taking a specific action to prevent a condition will be beneficial and effective (Bandura, 1986).

Perceived barriers: The degree to which negative aspects of an action serve as barriers to action, causing avoidance (Bandura, 1986).

Cues to action: Triggers that prompt an individual to action (Bandura, 1986).

Other variables: Demographic, sociopsychological and structural variables that make up an individual's perceptions of susceptibility, severity, benefits, and barriers (Bandura, 1986).

Self-efficacy: An individual's confidence that he or she can take action successfully (Bandura, 1986).

Human papillomavirus (HPV): Most commonly sexually transmitted infection among adolescents and young adults, causing approximately 70% of all cervical cancer cases (Hoover, Carfioli, & Moench, 2000).

HPV vaccine: A vaccination series approved by the Food and Drug Administration (FDA) for 9- to 26-year-old females (CDC, 2007)

Squamous cell carcinoma: A carcinoma that is made up of or arises from squamous cells (Merriam Webster Online Dictionary, 2007)

Adenocarcinoma: a malignant tumor originating in glandular epithelium (Merriam Webster Online Dictionary, 2007)

Precancerous lesion: Changes in cells that may, but do not always, become cancer (ACS, 2007)

Invasive cancer: Cancer that has spread beyond the layer of cells where it first developed to involve adjacent tissues (ACS, 2007)

Quadrivalent: Vaccine that is highly efficacious in the prevention of persistent HPV infection, cervical cancer lesions, and genital warts due to HPV 6, 11, 16, or 18 (Barclay & Murata, 2007).

Summary

This chapter provided a brief review of relevant research to the current study. Also included in the chapter were research questions, limitations, and delimitations. A definition of terms is also included. Chapter II will provide a more complete review of the current literature supporting the need for this study. Chapter III will outline the methodology of the study.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

This chapter provides an extensive review of the current literature regarding cervical cancer, the HPV, the HPV vaccine and the HBM. It will include sections on (a) the natural history of cervical cancer, (b) higher-risk populations for cervical cancer, (c) current screening recommendations, (d) barriers to screening (e) the nature of the virus and infection, (f) the vaccine and recommendations for use, (g) knowledge and attitudes regarding cervical cancer, HPV, and the HPV vaccine, and (h) the use of the HBM in exploring women's perceptions regarding cervical cancer, HPV, and the HPV vaccine and their intentions to receive the vaccine.

Natural History of Cervical Cancer

Cervical cancer is rated the second most common malignant tumor globally, and is etiologically linked to HPV infection (Ledwaba, Dlamini, Naicker, & Bhoola, 2004). Worldwide, nearly 250,000 women die of cervical cancer annually (Chandler, 2006; Robb-Nicholson, 2007). The ACS (2007) predicts that there will be approximately 11,150 new cases of cervical cancer in the United States in 2007, of which 3,670 will lead to death. Current research identifies risk factors for the disease including inadequately screening for HPV, having multiple sexual partners, and early onset of sexual activity (CDC, 2006; Ledwaba et al.).

Cervical cancer begins in the lining of the cervix and gradually develops from precancerous lesions to invasive cancer over time (ACS, 2007). Two types of cervical cancer include squamous cell carcinomas and adenocarcinomas, classified by how the cells look under a microscope. Approximately 80% to 90% of cervical cancers are classified as squamous cell carcinomas, which are composed of cells that resemble the flat, thin cells that cover the surface of the endocervix (ACS). Precancerous lesions are diagnosed more frequently than invasive cervical cancer and can easily be detected early with routine screening tests. The diagnosis of cervical cancer can be staged in order to determine how far the cancer has spread. The International Federation of Gynecology and Obstetrics (FIGO) Systems of Staging is used to classify the disease in stages 0 through IV (ACS). The ACS defines the stages as follows.

Stage 0 indicates superficial cancer that is only found in the cells lining the cervix, not near the deeper tissues of the cervix. Stage I cancer has invaded the cervix, but it has not spread anywhere else. This stage is further categorized into IA, IA1 and IA2. Stage IA is the earliest form of stage I. There is only a small amount of cancer and it can only be seen under a microscope. Stage IA1 signifies the area of invasion is less than 3 mm deep and less than 7 mm wide, whereas in stage IA2, the area of invasion is between 3mm and 5 mm deep and less than 7 mm wide. Then, stage IB is introduced and further categorized into IB1 and IB2. In stage IB, the cancer usually can be seen without a microscope. This stage also includes cancers that have spread deeper than 5 mm into connective tissue of the cervix or are wider than 7 mm and can only be seen using a microscope. Stage IB1 signifies the cancer is visible, but no larger than 4 cm and stage

IB2 means the cancer is visible and larger than 4 cm (ACS, 2007). Furthermore, stage II is described and categorized in stages IIA and IIB. In stage II, the cancer has spread beyond the cervix to nearby areas, but still inside the pelvic area. The cancer has spread beyond the cervix to the upper part of the vagina in stage IIA. Stage IIB indicates that cancer has spread to the tissue next to the cervix, also known as the parametrial tissue. In stage III, the cancer has spread to the lower part of the vagina or the pelvic wall. In stage IIIA, the cancer has spread to the lower third of the vagina, but not the pelvic wall and in stage IIIB, the cancer extends to the pelvic wall and/or blocks urine flow to the bladder. The most advanced stage of cervical cancer is stage IV, which is again categorized as IVA and IVB. In stage IVA, cancer has spread to the bladder or rectum; both are organs close to the cervix. In the final stage, IVB, the cancer has spread to distant organs beyond the pelvic area, such as the lungs. If cancer is detected in stage I, the chances of a woman living 5 years after treatment are 90-95%. If not detected until stage IV, the 5-year survival rate is only 20-30% (ACS).

High-Risk Populations for Cervical Cancer

Location

According to the Utah Department of Health (2007), cervical cancer rates in the state of Utah are lower than the national rate. From 1994-2003, Utah women averaged an incidence rate of 6.8 per 100,000 person years compared to the national rate of 9.3 per 100,000 person years (Hayden, 2006). Women suffering the greatest proportion of the disease burden in Utah are Hispanic women (Hayden).

Age

According to the surveillance epidemiology end report (SEER) from 2000-2004, the median age at diagnosis for cancer of the cervix was 48 years of age (National Cancer Institute [NCI], 2007b). Approximately 0.1% of women were diagnosed under age 20; 15.5% between 20 and 34; 26.2% between 35 and 44; 23.3% between 45 and 54; 15.1% between 55 and 64; 10.3% between 65 and 74; 7.0% between 75 and 84; and 2.5% 85+ years of age. Another sub group at risk for HPV and cervical cancer is college women. College-aged women are at greater risk of contracting sexually transmitted infections than the general population because of the high-risk sexual behaviors in which they engage (Ingledue et al., 2004).

Race/Ethnicity

The diagnostic rate of Hispanic women was 13.8 per 100,000 women indicating the highest rate among all ethnicities. African American women had a rate of 11.4 per 100,000 cases diagnosed while White women had 8.5 per 100,000 cases (NCI, 2007a). Fortunately, the number of cases diagnosed is much more than actual death rates among women. From 2000-2004, the median age at death for cancer of the cervix was 57 years of age. Although Hispanic women have the highest rate of cases diagnosed, African American women have the highest death rate of cervical cancer. Hispanic women's death rates are 3.3 per 100,000 deaths and African American women are 4.9 per 100,000 deaths. White women have the lowest death rate representing 2.3 per 100,000 deaths (NCI).

Income

Poor women in rural areas are especially vulnerable to HPV infection and cervical cancer because of low access to regular gynecological care and subsequently low access to timely follow-up care to irregular Papanicolaou (Pap) test results and HPV positivity (Sharpe et al., 2005). In a study conducted by Radecki-Breitkopf, Pearson, and Breitkopf (2005), 338 women undergoing cervical cancer screening at two clinics in Texas were surveyed on their knowledge of Pap testing. Overall, minority women and those of low socioeconomic status had (SES) poor understanding of Pap testing, thus making them a very vulnerable population. According to Radecki-Breitkopf and colleagues, it is important to evaluate the knowledge base and informational needs of women of lower socioeconomic status, to ensure that they will continue screening as recommended, despite financial hardships.

Current Screening Recommendations

Cervical cancer screening using the Pap test is a low cost, effective screening test for preventing invasive cervical cancer (CDC, 2006). The Pap test was named after Dr. George Papanicolaou more than 50 years ago and was called a Pap smear prior to being called a Pap test (Mayo Clinic, 2007). The test is a simple procedure that collects cells from the cervix and the narrow, lower end of the uterus using an instrument called a speculum. After scraping the cells, physicians would then “smear” the cells onto a glass slide, hence the name Pap smear. Currently, the cells are transferred in a liquid filled tube and sent to a laboratory for testing (Mayo Clinic). The test effectively detects cervical

cancer and any changes in cervical cells that may suggest future cancer development (Mayo Clinic).

Pap tests should be performed during a pelvic examination at a clinical visit with any knowledgeable health care provider, and the health care provider should discuss the importance of the exam as a means to detect cervical cancer (CDC, 2006). Important considerations to follow, according to the CDC includes: (a) pap tests should not be considered a screening test for STI's; (b) all women should be considered for cervical cancer screening, regardless of their sexual orientation; (c) women who have had a total hysterectomy do not require a routine Pap test unless the hysterectomy was performed because of cervical lesions; and (d) pregnant women should have a Pap test as part of routine prenatal care.

Both the ACS and American College of Obstetricians and Gynecologists (ACOG) currently recommend annual Pap test screening for women 21-30 years and then every 2-3 years for women older than 30 if three consecutive annual pap tests are negative (CDC, 2006). Women that are 70 or older can stop having pap tests if they have had three normal tests in a row over the past ten years (Mayo Clinic, 2007).

Barriers to Screening

Today, as many as 82% of U.S women report having been screened with a Pap test in the past 3 years (CDC, 2006). Despite this, screening programs are not reaching all women in the U.S. It is estimated that half of the women diagnosed with cervical cancer

have never been screened for cervical cancer, and an additional 10% have not been screened in the past 5 years (CDC).

An interesting study was done by McGarvey and colleagues (2003) on cancer screening practices and attitudes comparing women in three different ethnic groups. A total of 78 low-income Hispanic, Vietnamese, and Cambodian American women over age 40 volunteered to be interviewed in their native language. The HBM scales for measuring beliefs related to breast cancer (Champion, 1993) were used to assess the participants' attitudes regarding risk of breast and cervical cancer and participation in breast cancer screening behaviors. The women were asked questions related to their perceptions of being susceptible to cancer, benefits of screening and barriers to screening. Useful information was provided implying that all three samples of women were more likely to perceive barriers to having a mammogram performed compared to nonminorities. Interestingly, health beliefs were more similar among Hispanic and Vietnamese women than Vietnamese and Cambodian women. Approximately 72% of Hispanic women and 69% of Vietnamese women reported that cost and lack of insurance coverage were reasons for not being screened. Cambodian women cited lack of transportation (38%) and language barriers (46%) as reasons for not being screened. In addition, Cambodian women also mentioned that they believed screening was unnecessary due to their older age and lack of sexual activity, a belief not indicated by either of the other groups. Education about cancer screening in itself can be an effective outreach strategy for women of all ethnicities, according to researchers (McGarvey et al.).

Several recent studies suggest a strong association between obesity and receipt of cancer screening practices (Ferrante, Chen, & Jacobs, 2006; Fontaine, Heo, & Allison, 2001; Ostbye, Taylor, Yancy, & Krause, 2005). Ferrante and colleagues conducted a study on breast and cervical cancer screening in 1,809 obese minority women using survey data from a retrospective chart review of women in three urban areas of New Jersey. Information abstracted from the charts included demographic data, exclusionary conditions, and other factors that might influence breast or cervical cancer screening (weight, age, ethnicity, smoking status, educational status, family history of breast or cervical cancer, and chronic medical conditions). The main outcome variables were up-to-date mammography and Pap test screenings. The main independent variable was obesity, which was defined as having a body mass index kg/m2 >30 kg. Surprisingly, results from this study indicated that there was not a difference in mammography rates among obese and nonobese women. However, obese women were less likely to be up-to-date in Pap test screenings. Further studies are needed to determine barriers and effective interventions to improve screening in obese minority women (Ferrante et al.).

Fontaine and colleagues (2001) complied data from the Behavioral Risk Factor Surveillance System (BRFSS), a nationwide telephone survey, on body weight and cancer screening among more than 80,000 women. Subjects were categorized as underweight, desirable weight, overweight, obese class I, obese class II, and obese class III. The outcome measure of their study was number of years since the women's most recent Pap screening test, mammography and clinical breast examination (CBE). Factors such as age, race, smoking status and health insurance were adjusted accordingly.

Multiple logistic regressions were calculated for each of the three outcome variables. Overall, 82% of the subjects reported having obtained a Pap screening test within the previous 2 years. Surprisingly, the results also indicated that the relationship between BMI and screening was significantly different between White and Non-White participants on CBE, but not for Pap smear or mammography. These data are important in indicating that weight may be a strong correlate of screening behavior, particularly among white women. Again, understanding this correlation is essential in designing interventions to promote cancer screening in high-risk populations (Fontaine et al., 2001).

Ostbye and colleagues (2005) completed another study on the associations between obesity and receipt of screening mammography, Pap tests and influenza vaccinations; compiling results from the Health and Retirement Study (HRS) and the Asset and Health Dynamics Among the Oldest Old (AHEAD) Study. The researchers evaluated the association of BMI and screening practices among middle-aged women and influenza vaccination among the elderly. The HRS included 4,439 women aged 50-61 years of age and the AHEAD included 4,045 women and 2,154 men aged 70 years or more. The data obtained from these surveys indicated when BMI was >18.5 kg; there was indeed a relationship between BMI and Pap test screenings among middle aged white women, but not black women. They also found a similar association between BMI and influenza vaccination among the elderly. The HRS and AHEAD did not include measures of the health beliefs, attitudes or cultural views of subjects regarding obesity and medical and preventative services. As past research has declared, cultural sensitivity is an important factor in predicting screening behaviors (Ostbye et al.).

Human Papillomavirus

HPV infection poses a significant public health concern (Beatty, O'Connell, Ashikaga & Cooper, 2003; CDC, 2006). Genital HPV infection is the most common sexually transmitted virus in the United States, causing genital warts, cervical cell abnormalities and cervical cancer in women (Friedman & Shepeard, 2006). Roughly, 20 million Americans are currently infected with HPV and an additional 6.2 million become newly infected each year. It is so prevalent that most sexually active adults will have become infected with HPV sometime in their lives; although most will never even know it because it is asymptomatic (Friedman & Shepeard).

The majority of HPV infections are asymptomatic and resolve on their own without clinical consequences (Friedman & Shepeard, 2007). Nonetheless, some HPV infections do contribute to the development of cervical cancer.

Nature of Virus and Infection

Likes and Itano (2003) described HPV as a small, double stranded DNA virus that is epitheliotrophic, meaning it has a special affinity for epithelial cells. HPV infects certain types of epithelium, such as epithelium in the genital area and the head and neck. Of the more than 100 types of papillomaviruses, about 40 affect the genital tract, whereas the rest infect skin on other areas of the body, such as the hands and feet (Likes & Itano). Although, it is fair to say that HPV is not just a sexually transmitted infection, the majority of cervical cancer cases are associated with sexual or skin to skin contact (CDC, 2006; Ingledue et al., 2004).

HPV Strains

There are many different types of human papillomaviruses that are associated with a wide variety of tumors. Some tumors are harmless or benign such as warts, and others are malignant or cancerous (Mays et al., 2000). Genital HPV can be divided into "high risk" (oncogenic or cancer-associated) types and "low risk" (nononcogenic; non cancerous) types (CDC, 2006). HPV 16 and 18 are the most common high risk types found in cervical cancer, while HPV 6 and 11 are the most common low risk types found in genital and respiratory tract warts (CDC).

Human Papillomavirus Vaccine

In June of 2006, the FDA licensed the first vaccine developed to prevent cervical cancer and other diseases in females caused by certain types of HPV in the United States (CDC, 2006). On June 29, 2006, the Advisory Committee on Immunization Practices (ACIP) voted to recommend use of the vaccine called Gardasil, manufactured by Merck Pharmaceuticals, in 9- to 26-year-old females (CDC, 2006). This quadrivalent vaccine, made from noninfectious HPV-like particles, protects against four HPV strains (6, 11, 16, 18), which are responsible for 70% of cervical cancers and 90% of genital warts. According to the CDC (2007), studies have found the vaccine to be almost 100% effective in preventing diseases caused by the four HPV types covered by the vaccine; including precancers of the cervix, vulva and vagina, and genital warts. The vaccine has mainly been studied in young women who have not been exposed to any of the four HPV types in the vaccine. The vaccine was found to be less effective in young women who

had already been exposed to one of the HPV types covered by the vaccine. This vaccine does not treat existing HPV infections, genital warts, precancers or cancers.

Additional research is currently underway and various clinical trials have indicated promising results. For instance, the NCI stated that their research team followed young women (average age 23) who had received three doses of either an experimental HPV vaccine or a placebo between 2000 and 2003 while participating in an earlier study by the same researchers (NCI, 2007b). The earlier study showed that the experimental vaccine prevented most infections with HPV-16 and HPV-18, the two types of HPV that cause most cases of cervical cancer. The vaccine also partly protected many women from two other strains of HPV, HPV-45 and HPV-31, which are the third and fourth most common HPV types associated with cervical cancer. None of the women who were vaccinated reported any serious side effects from the medication. However, public health officials note that this vaccine will not replace other prevention strategies since it will not work to prevent all genital HPV strains to which people may become exposed (CDC, 2007).

Current Recommendations for Vaccination

The AAP, the ACIP of the Centers for Disease Control, and the AAFP have produced a recommended immunization schedule for children and adolescents (AAP, 2007) living in the United States. The schedule reflects the addition of the HPV vaccine for girls 11-12 years of age whom have not yet become sexually active, with “catch up” vaccines for girls 13-18 years of age (AAP). Pichichero (2007) stated that the vaccine is also recommended for women up to 26 years old and/or women who have received or

completed the vaccination series. The FDA is currently examining the effectiveness of the vaccine for women over 26 years old, but the conclusions of this examination could take up to five years (Pichichero).

The vaccination series consists of three intramuscular injections at 0 months, 2 months, and 6 months (AAP, 2007). Current research indicates the vaccine is not recommended for pregnant women or women already infected with HPV (Robb-Nicholson, 2007).

Knowledge and Attitudes Regarding Cervical Cancer, HPV, and HPV Vaccination

Currently, there is an abundance of research on U.S. women's knowledge and attitudes regarding HPV, its link to cervical cancer and getting the HPV vaccination as a means to prevent infection. To date, there has been no research conducted on Utah women's knowledge and attitudes regarding the above mentioned. This researcher identified eight relevant studies that follow below.

Tiro and colleagues (2007) conducted a study that analyzed cross sectional data from women (n = 3,076) ages 18-75 years old responding to the 2005 Health Information National Trends Survey (HINTS). Their objective was to assess factors associated with U.S women's awareness of HPV and knowledge about its link to cervical cancer. The HINTS 2005 included items that assessed sociodemographics, health status, personal and familial cancer history, general and specific cancer knowledge, health communication preferences and cancer screening behaviors.

Results of this study indicated that knowledge about HPV among U.S women was relatively low; 40% of women (*n* = 1,248) reported that they had never heard of HPV. Among those that had heard of it, less than half knew that HPV causes cervical cancer. Nonetheless, awareness of HPV has increased over the past decade, but knowledge of its link to cervical cancer remains low (Tiro et al., 2007).

Another study conducted by Sharpe and colleagues (2005) explored women's knowledge and understanding of abnormal Pap tests and HPV. The study was part of a five site initiative funded by the CDC to investigate women's knowledge and experience with HPV and its impact on their lives to guide the development of educational messages. Forty-four in depth interviews were conducted with low-income, HPV-positive women ages 18-64 years. Participants were asked 19 open ended questions and audio taped with consent for research purposes. Of the 44 women studied, 21 reported they had been told of their HPV diagnosis and responded to questions about having HPV, including what their health care provider told them, what they would advise other women with HPV, and what they told family, friends and partners. The second most common theme was the association between HPV and cancer. While 19 women said that HPV can or does cause cancer, only half of these women mentioned cervical cancer specifically (Sharpe et al.).

An interesting study was done by Hoover and colleagues (2000) on HPV vaccine acceptability among adolescents. The purpose of this study was to evaluate HPV knowledge and priorities, HPV vaccine acceptability, and willingness to participate in an HPV vaccination clinical trial among a group of adolescent and young adult women in the United States. A convenience sample of 60 women between 15 and 28 years old were

obtained from four sites on the Southern New Jersey Shore, which were frequently visited by young teens and adults. Mostly unaccompanied women or women without a male partner were approached and asked if they were willing to fill out a 10-15 minute survey as they were assured of their confidentiality. Women that agreed to participate read a short statement about a hypothetical vaccine trial to prevent Human Papillomavirus. The women then answered questions designed to assess knowledge about HPV, concerns about the risks of sexual activity, attitudes toward using an HPV vaccine and participation in an HPV vaccine trial.

Among five potentially adverse outcomes of sexual activity, 86.6% ranked AIDS as their biggest concern, while 52% of the participants ranked cervical cancer as their second biggest concern. Only 15% of this sample indicated they would be extremely likely to pay for an HPV vaccine if the costs were not covered by insurance, surprisingly. Almost 70% felt that men should receive a vaccine against oncogenic HPV to protect potential sexual partners even though men do not develop cervical cancer.

Many of the women in this study would not participate in a 3-year HPV vaccine clinical trial under conditions that were likely to exist as described by the interviewers. Less than 30% would participate in a trial that included three vaccine shots and biannual pelvic exams. Various reasons were listed in relation to non-participation in a clinical trial such as time, inconvenience and embarrassment of getting pelvic exams.

Although knowledge of HPV was low in this group, and many did not agree to take part in a 3-year vaccine trial, these women were very concerned about cervical cancer and genital warts. The researchers concluded by emphasizing the importance of

increased education of HPV in American high schools. Researchers feel it may not be very hard to convince adolescent women of the importance of the HPV vaccine, but rather hard to convince parents and community members (Hoover et al., 2000).

Hopenhayn, Christian, Christian, and Schoenberg (2007) conducted a similar study on the attitudes aimed at the Human Papillomavirus vaccine in two Appalachian Kentucky counties. Approximately 629 women were randomly telephoned and surveyed on HPV vaccine acceptance for themselves and for adolescent girls. In these particular counties, cervical cancer incidence and mortality rates are among the highest in the United States. To participate in the survey, participants had to be at least 18 years of age and could not have undergone a hysterectomy in their past. Survey topics included Pap test knowledge and practices, awareness of HPV, acceptability of HPV testing and vaccination, smoking behavior and demographic information. The survey sample was first characterized by univariate analysis, with respect to few basic descriptive characteristics such as race, income, education and current smoking status. Bivariate and multivariate analyses were conducted for the majority of HPV and HPV vaccine acceptability questions. In terms of knowledge of HPV, 44.4% of the respondents stated they had heard of HPV from either a health professional or by the media. Although acceptance of HPV vaccine varied across age groups, the majority of women in this study indicated interest in receiving an HPV vaccine (85.2%). Overall, the acceptance of a vaccine to prevent HPV decreased with age. Also of interest, women who had never been married or women who were widowed were less likely to accept the HPV vaccine. Nonetheless, women in the middle-income groups showed higher acceptability toward

the HPV vaccine, as did women without health care coverage and women who smoke. When demographic variables were entered into a logistic regression analysis for vaccine acceptance, age and smoking, all remained statistically significant ($p < 0.05$).

In comparison to recently published studies, these researchers indicate that participants in this study were more aware of the existence of HPV, both nationally and internationally. A somewhat surprising result was that smoking behavior was the strongest predictor of HPV vaccination acceptability for both the respondents themselves and for girls aged 10-15 years. Various reasons for this strong association is included in the study, possibly due to the fact that cervical cancer incidence are higher among women who smoke (Hopenhayn et al., 2007).

Another study was published by researchers Ferris, Waller, Owen, and Smith (2008) on HPV vaccine acceptance among southern U.S., mid-adult women. Although the vaccine is currently recommended for 9-26 year old women, mid-adult women (>27 years old) have expressed a keen interest in receiving the vaccine to stay healthy and lower their risk of cervical cancer and genital warts.

A convenience sample of 472 mid-adult women completed a survey that included demographics, knowledge, and behavioral variables as potential correlates of vaccine acceptance. An inclusion limit of women older than 25 years was considered, and this range was selected before FDA approval for current vaccination recommendations. Survey participants first completed a 46 question (preintervention) survey and received a one-page educational pamphlet with information about HPV and HPV vaccines. Then, participants completed another 23 question (postintervention) survey. Both univariate and

multivariate analyses were completed for demographics, knowledge and behaviors. For knowledge and behaviors before intervention, knowledge that HPV causes cervical cancer and knowledge of being at risk for HPV infection were significant correlates of wanting the HPV vaccine after intervention (p = .001). Mid-adult women with a history of an abnormal Pap test also expressed various motives for wanting the vaccine. The results of this study reinforce the necessity of education aimed at mid adult women on HPV and HPV vaccines.

Holcomb, Motino Bailey, Crawford, and Ruffin (2004) conducted a similar study assessing the knowledge and behaviors related to HPV infection in 289 adult men and women in the state of Michigan. Sample participants were derived from a student health clinic and two community based family practice clinics. Participants were asked to complete a 52-item questionnaire, which included information about demographics, HPV knowledge, sexual history, attitudes towards sexually transmitted infections, and what participants would do if they or their partner were diagnosed with HPV. As prior research has indicated, this study also suggests knowledge about HPV among this sample was low, with 12% having never heard of genital warts, and 33% having never heard of HPV before. Knowledge scores were significantly different between groups classified by gender (p = .001) and marital status (p = .001). However, knowledge scores were not significantly different between ethnic groups, sexual preference, age at first intercourse, and smoking status. Holcomb and colleagues discussed the fact that poor knowledge is not just limited to college-age adults, as this study involved participants from community based family practice clinics. The authors concluded that it is unknown whether

increasing awareness and knowledge of HPV would change adults' participation in risky sexual behaviors (Holcomb et al.).

Researchers from New Mexico State University and Hospital de la Familia in Ciudad Juarez, Mexico (just across the U.S. border) implemented a descriptive pilot study to (a) assess the willingness of women residing in Ciudad Juarez to use the HPV vaccine, evaluate their perceptions about the HPV vaccine, and determine possible barriers to vaccine acceptance and compliance, and (b) use the respondent responses to develop appropriate research questions for the main study (Moraros et al., 2006). The pilot study included a 25-item questionnaire and explored the views of 60 adult Mexican women, all of whom were mothers of adolescent girls between 10-14 years of age, on four interest areas: HPV knowledge, HPV vaccine knowledge and attitudes, barriers to vaccine use and perceived potential side effects of the HPV vaccine. In this study, only 7% of respondents knew that HPV was a virus or STI. Nearly 90% (n = 50) had not heard of the HPV vaccine, but 62% of those believed a vaccine would prevent HPV infection. Surprisingly, 38% said their church would not approve of HPV vaccination among 10-14 year old girls. It is quite evident that from this study that the effectiveness of such a vaccine on the US-Mexico border will depend on the willingness of the mainly Hispanic population of interest to accept and use the HPV vaccine. Appropriately designed culturally sensitive interventions will indeed help increase knowledge and awareness of HPV and the HPV vaccine (Moraros et al.).

Another study regarding HPV education in middle and high schools of Vermont was conducted by Beatty, O'Connell, Ashikaga, & Cooper (2003). A survey instrument

was developed by the HPV Working Group and the Fletcher Allen Health Care, University of Vermont and the Vermont Cancer Center to provide baseline information on the status of HPV education in middle and high schools in Vermont. The 17-question survey was based on the PRECEDE-PROCEED planning model used to describe factors that may contribute to a health problem within a community. Surveys were mailed to Vermont public middle school and high school nurses and educators. One hundred eight surveys were returned (n = 108); 61% were received from high schools and 39% were received from middle schools. The survey resulted in some interesting findings stating that 62% of respondents indicated insufficient time was spent teaching about HPV. Enabling factors such as resources, student interest and school support were identified, with only 13% of respondents indicating that they had the resources for teaching about HPV. Less than half of respondents (37%) felt that students wanted to know about HPV and slightly more than half (55%) of the respondents reported that school policies supported the respondent's ability to teach about HPV and other sexually transmitted infections.

Overall, HPV/STI education was not being implemented in Vermont public schools for a variety of reasons. Respondents' main concern was "not enough class time" and "not knowledgeable enough to teach the subject." The researchers acknowledged that results from this survey underscore a need for including HPV education materials to adolescents in middle schools and high schools (Beatty et al., 2003).

The above-mentioned studies indicate that adolescents and young women in the United States are uninformed about cervical cancer, HPV, and the HPV vaccine. Various

reasons cited were personal beliefs, vaccine acceptability, and minimal availability of educational materials in public schools.

Health Belief Model

The HBM was developed in the 1950s by psychologists Hochbaum, Rosenstock and Kegels from the U.S. Public Health Service to help explain why people would or wouldn't use health services (Rosenstock, 1974). The HBM indicate that health behaviors are determined by health beliefs and readiness to take action (Abood, Black, & Feral, 2003).

The HBM is the most widely used model of health behavior and has been applied in a number of contexts, including: use of preventative screenings, obtaining immunizations, compliance with medical regimens and response to illness symptoms (Bish, Sutton, & Golombok, 2000). The HBM has been expanded, broken down into components, compared to other frameworks and analyzed using a wide variety of multivariate techniques (Rosenstock, 1974). The components of the model include; perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, other variables and self efficacy (Rosenstock).

Perceived susceptibility refers to one's subjective perception of the risk of contracting any given health condition. In a medical context, this includes the acceptance of any diagnosis, personal estimates of resusceptibility and susceptibility to the illness in general (Rosenstock, 1974). Perceived severity refers to one's feelings concerning the seriousness of contracting any given health condition, or leaving it untreated, and

possible social consequences. The combination of susceptibility and severity has been referred to as perceived threat (Rosenstock). Perceived benefits refer to one's knowledge, attitudes or beliefs of a particular course of action that can be taken to reduce risk of disease or illness. Included in this construct are health-related benefits as well as non-health related benefits. An example of a non-health related benefit is getting vaccinated because your insurance company will cover the cost, rather than getting vaccinated to decrease risk of illness (Rosenstock). A perceived barrier refers to one's beliefs about the tangible and psychological costs of the advised action. Common barriers to proper health care include; inconvenience, cost, time-consumption and so forth. An example of a perceived barrier to getting vaccinated might be inconvenience of the location of the clinic (Rosenstock). Cues to action is not an original component of the HBM, but rather added to the model over the years. It refers to the point in one's life in which they decide to take action towards any given health behavior. Many things may contribute to this decision, such as acquiring an illness, trying to please a friend or family member or even media publicity. One must have perceptions about the susceptibility and seriousness of an illness, and understand the barriers and benefits of making changes to their health behavior prior to taking action (Rosenstock). As is the case with many other theories and models, there are always a few other variables to understand. In the HBM, demographic and sociopsychological variables may affect the individuals' perceptions and therefore, indirectly influence particular health-related behaviors (Rosenstock). This is referred to as other variables in the HBM. The last component of the HBM is self-efficacy. This construct refers to "the conviction that one can successfully execute the behavior required

to produce the outcomes" (Rosenstock). This was added to the model after several investigations and years of revisions. Self-efficacy assumes that the likelihood of taking action is not only a function of beliefs related to outcomes, but also a function of a person's belief that he/she is behaviorally capable of achieving the desired outcome (Abood et al., 2003).

Health Belief Model used in Cervical Cancer and HPV Research

The use of theories in health education studies helps guide the research and provides a framework for explaining the results of a study. There is a limited amount of research on the inclusion of the HBM in cervical cancer and HPV research.

Ingledue and colleagues (2004) conducted a study to better understand college women's knowledge, perceptions and preventative behaviors regarding Human Papillomavirus infection and cervical cancer. The study applied the HBM as a theoretical framework in determining perceived seriousness, perceived susceptibility and preventative behaviors regarding HPV and cervical cancer. Upon a review of the literature, the researchers developed a 40-item questionnaire to assess the above mentioned, with the assumption of obtaining accurate, honest responses from the college women. Approximately 1,000 full-time college women between the ages of 18-30 were randomly selected via the registrar's computer at a large Midwestern university. Of the 1,000 students selected, 428 students (n = 428) returned completed questionnaires via paper mail.

Relationships between HPV and cervical cancer knowledge and perceived seriousness, perceived susceptibility and preventative behaviors were examined. Using Pearson correlation coefficients, no significant relationship was found to exist between HPV and cervical cancer knowledge and perceived susceptibility to HPV or cervical cancer (r = .020, p = .680). A significant negative correlation was found to exist between HPV and cervical cancer knowledge and perceived seriousness of HPV and cervical cancer (r = -0.242, p = .000), indicating that as knowledge increased, perceived seriousness decreased. The researchers concluded that college women participating in this study demonstrated low levels of knowledge concerning HPV and cervical cancer while exhibiting high-risk sexual behaviors. Further HPV and cervical cancer research needs to be conducted among women of the same age group that are not part of a college or university community, according to this study (Ingledue et al., 2004).

An additional study using the HBM was conducted by Denny-Smith and colleagues (2006). The purpose of the study was to assess knowledge of, perceived susceptibility to, perceived seriousness of, and risk behaviors regarding Human Papillomavirus and cervical cancer among female nursing students enrolled in a baccalaureate nursing program. The HBM was used to examine the relationship between people's beliefs and health specific behaviors.

In this study, a 40-item questionnaire was distributed to a convenience sample of 240 female nursing students. The instrument asked questions related to awareness of HPV and cervical cancer as well as sexual behaviors and condom use. In this study, the hypotheses were tested examining the relationship between HPV and cervical cancer,

knowledge, perceived seriousness, perceived susceptibility, number of sexual partners and condom use. Using Pearson's correlation coefficients, no significant relationship was found between HPV/cervical cancer knowledge and perceived susceptibility (p = .67) or perceived seriousness (p = .69). However, a significant positive relationship was found between HPV/cervical cancer knowledge and number of partners (p = .01) indicating that as knowledge increased, so did number of partners. Finally, a significant relationship was also found between susceptibility and severity of HPV and cervical cancer (p = .04) indicating that as perceived susceptibility increased, so did perceived seriousness. The researchers were surprised to find that the participating female nursing students demonstrated rather low knowledge levels for what one would expect from upper level nursing students (Denny-Smith et al., 2006).

In conclusion, this section provided interesting hindsight regarding women's knowledge and attitudes towards cervical cancer, HPV and the HPV vaccine. Women in the U.S lack knowledge and perceptions related to their personal susceptibility of the disease and their thoughts on the severity of cervical cancer as a whole.

Summary

This chapter provided an extensive review of current literature on cervical cancer, HPV, the HPV vaccine, and the HBM. Studies reported in the literature review showed that women in this country lack the knowledge, and have been misinformed about cervical cancer and/or HPV, which is affecting their perceptions towards their susceptibility of acquiring cervical cancer or the HPV.

There is a minimal amount of research on women's thoughts towards the HPV vaccination as a means to prevent the virus that leads to cervical cancer and possible eventual death. There are also few studies that utilize the HBM in relation to HPV vaccine acceptance among 18- to 26-year-old women in the Western United States. The need for and purpose of this study has been justified based on the literature reported in this review. Chapter III will explain the methodology of the study.

CHAPTER III

METHODOLOGY

The purpose of this chapter is to provide an overview of procedures used to guide this study. Information included explains research design, sample, sample demographics, instrumentation, data collection procedures, pilot testing, and data analysis.

Research Design

A cross-sectional, quantitative study was conducted to determine the knowledge, attitudes, and perceptions of 18-to 26-year-old Utah women regarding cervical cancer, HPV and the HPV vaccine. Survey research was conducted in health clinics with a sample of convenience.

Sample

The sample included 18- to 26-year-old women who were not pregnant. The subjects were obtained between June and September 2008 in various clinics throughout the Bear River Health District, including the Cache Valley Women's Center, USU Student Wellness Center and the Logan, Brigham, and Tremonton offices of the Bear River Health Department (Appendix C, D, E). A power analysis was conducted at the Office of Methodological Data and Research (OMDR) at Utah State University, under the direction of Chad Bohn, to determine a suitable number of participants needed for the study. The analysis determined an appropriate sample size of approximately 209 study participants. This was based on a small effect size of .20, power of .08, and an alpha level

.05. The alpha level .05 was utilized because researchers believe this level is most suitable at determining the probability that the test will lead to a Type I error. In other words, this means the likelihood of obtaining sample data in the critical region when the null hypothesis is true (Gravetter & Wallnau, 2005).

The sample consisted of 212 participants. Although the majority of the sample (n = 172, 81.1%) were White women, Non-White Hispanics represented 9%, African Americans .5%, Asians 1.4%, and multiracial were 2.8% of the sample. Approximately 5.7% of the sample indicated "other" as their race.

Most of the women who participated in the study (n = 90, 42.5%) stated they had some college as their highest level of education completed, while 31.6% had a high school education as their highest level completed. In this study, 11.8% of participants reported their highest level of education as trade school or certification program, 9.4% reported having completed a Bachelors degree, 4.2% less than high school and one participant reported having completed a post graduate degree (see Table 1).

Instrumentation

A survey was developed by the researcher for the purpose of this study. Questions were derived from past surveys (Denny-Smith et al., 2006; Hoover et al., 2000; Ingledue et al., 2004; Tiro et al., 2007) and modified to address and answer the research questions for this particular study (see Appendix A). The internal validity and face content of the survey was confirmed and peer reviewed by a panel of experts prior to pilot testing. No

Table 1

Sample Demographics

Demographic	Valid *N*	Percent
Age		
18	23	10.8
19	29	13.7
20	27	12.7
21	26	12.3
22	20	9.4
23	25	11.8
24	20	9.4
25	15	7.1
26	27	12.7
Race		
Caucasian	172	81.1
Non-white Hispanic	19	9.0
African American	1	.5
Asian	3	1.4
Multiracial	5	2.4
Other	12	5.7
Education		
Less than high school	9	4.2
High school	67	31.6
Trade school/certification	25	11.8
Some college	90	42.5
Bachelors degree	20	9.4
Post graduate degree	1	.5

Note. $N = 212$.

immediate changes were required prior to survey administration, other than rearranging the ordering of survey items.

Survey items were categorized in relation to the research questions. There were two inclusion/exclusion items, two demographic items, six knowledge based items, one perceived susceptibility item, three perceived severity items, two perceived barriers items, and three items related to perceived benefits. A survey item assessing behavioral

intention to be vaccinated against HPV was also included. Knowledge survey items were yes/no, multiple choice, and true/false. Yes/No items were scored with Yes = 1 point and No = 0 points. The multiple-choice questions had only one correct answer and participants received one point for every correct answer. True/False items were scored according to the correct answer. The correct response received one point and the incorrect response received no point. Scores were summed at the end to calculate an overall knowledge score.

The HBM items (perceived susceptibility, perceived severity, perceived barriers and perceived benefits and behavioral intention) were scored on a Likert type scale ranging from 1 to 5. As such, one represents "strongly agree," 2 "agree," 3 "not sure," 4 "disagree," and 5 meant "strongly disagree." The behavioral intention was also measured on the same Likert type scale.

Data Collection Procedures

Following the Utah State University Institutional Review Board (IRB) approval, survey data collection began in June 2008 and concluded in September 2008. Women involved in the study received a brief, confidential survey along with a Letter of Information (see Appendix B). All women involved voluntarily completed the survey if they so chose. The office managers and nurses agreed to be responsible for collecting the surveys and ensuring they were kept in a safe, confidential place. The student researcher provided a box which was locked in the manager's office at the end of each business day. The student researcher periodically checked in with the office manager and/or nurses to

verify that surveys were being collected in an appropriate fashion. These visits included a small gift for the office manger and nursing staff as an incentive to continue survey administration and assist in the data collection process.

Pilot Testing

Once the survey instrument was reviewed for its accuracy and proper adjustments were made as recommended by the expert panel, a pilot test occurred. The pilot test was conducted with approximately twenty 18- to 26-year-old women at the Student Health and Wellness Center on the campus of Utah State University in May 2008. This was conducted in a similar fashion to the actual survey administration that took place at the various clinics. Pilot testing was advantageous because it alerted the researcher to the idea of expanding research locations in order to obtain survey data in a reasonable amount of time. The pilot test, however, did not alert the researcher of any other major issues and no survey items were changed, added or removed from the instrument.

Data Analysis

Data collected from this research study were analyzed using both descriptive and inferential statistics utilizing SPSS software for Windows. Descriptive statistics were used to summarize, organize and simplify data, while inferential statistics allowed for generalizations to be made about the overall population from which the sample was selected (Gravetter & Wallnau, 2005). The calculation of descriptive statistics included calculating means and standard deviations. A PLUM ordinal regression was also

conducted to determine women's behavioral intention to get vaccinated. In statistics, this is the regression model for ordinal dependent variables. It can be thought of as an extension of the logistic regression model for dichotomous dependent variables, allowing for more than two (ordered) response categories (Wikipedia, 2009). The researcher determined the relationship between women's attitudes and perceptions and whether it predicted their intention to get vaccinated against the Human Papillomavirus. Table 2 provides a summary of the comparisons that were made as part of this study.

Summary

This chapter explained the methodology of the study. The research design, sample, sample demographics, instrumentation, data collection procedures, pilot testing, and data analysis were all discussed in detail.

Table 2

Research Questions, Instrument Items, and Data Analysis

Research question	Instrument items	Data Analysis
How accurate is 18-26 year old women's knowledge regarding cervical cancer, HPV and the HPV vaccine?	5,6,7,8,9,10	Mean, mode, and standard deviation
Do 18-26 year old women believe there are severe consequences to getting HPV and cervical cancer?	12, 13,	Mean, mode, and standard deviation
Do 18-26 year old women believe they are susceptible to getting HPV and cervical cancer?	11	Mean, mode, and standard deviation
What do 18-26 year old women perceive as barriers to obtaining the HPV vaccination?	16,19	Mean, mode, and standard deviation
What do 18-26 year old women perceive as benefits to obtaining the HPV vaccination?	15,20	Mean, mode, and standard deviation
Do 18-26 year old women's knowledge levels and attitudes (i.e., perceived susceptibility, severity, barriers, benefits) regarding HPV and cervical cancer predict their intention to receive the HPV vaccination?	18	Mean, mode, standard deviation, and PLUM ordinal regression

CHAPTER IV

RESULTS

A study was conducted, using the constructs of the HBM, to assess women's knowledge and attitudes regarding cervical cancer, HPV and the HPV vaccine and to determine whether they predict women's intentions to receive the HPV vaccine. This chapter discusses the results of the six research questions posed in Chapters I and III, and the results are presented below.

Research Question #1

Research question #1: *How accurate is 18- to 26-year-old women's knowledge regarding cervical cancer, HPV, and the HPV vaccine*? When subjects were asked if they had heard about HPV, most women (*n* = 172, 81.1%) reported they were at least familiar with the virus. The remaining 18.9% had not heard of the virus. When asked about viral transmission, nearly 63% could correctly answer how HPV is transmitted from one person to another when given multiple choices to choose from. The remaining 37% could not correctly answer how HPV is transmitted. Although women seemed to be informed about HPV and HPV transmission, more than half of the sample (*n* = 122, 57.5%) could not correctly identify proper ways of decreasing their risk of becoming infected with HPV. Another survey item, referencing knowledge, sought to determine HPV and its link to genital warts and cervical cancer. Results indicated that 76.9% of women in this study felt it was true that there is a link. Nonetheless, most women (*n* = 168, 79.2%) could identify ways to prevent themselves from acquiring cervical cancer

despite their inability to identify ways to decrease their risks of becoming infected with the virus.

Finally, one survey item provided that over 70% of the study participants (*n*= 152, 71.7%) stated they have heard of the modern day vaccine, Gardasil, which protects women from common strains of HPV, while only 28.3% said they had never heard of the vaccine. This information is summarized as a whole in Table 3.

Research Question 2

Research question #2: *Do 18- to 26-year-old women believe there are severe consequences to getting HPV and cervical cancer?* When asked if getting HPV is a serious health issue, approximately 80.7% of the sample reported they either strongly agreed or agreed that it is a serious health issue. Moreover, 4.2% either strongly

Table 3

Research Question #1 Results

Survey item	Response	*n*	Percent
Have you heard of the Human Papillomavirus (HPV)?	Yes	172	81.1
	No	40	18.9
How is HPV transmitted from one person to another?	Sexual contact[+]	133	62.7
	Sharing a drink/through needles/don't know	79	37.3
How can you decrease your risk of becoming infected with HPV?	Abstinence/sex with condom/avoid smoking	122	57.5
	All of the above[+]	90	42.5
HPV is linked to genital warts and cervical cancer	True	163	76.9
	False	49	23.1
How can you prevent yourself from acquiring cervical cancer?	Safe sex/pap screenings/vaccinations	44	20.8
	All of the above[+]	168	79.2
Have you heard of a vaccine that protects women from common strains of HPV	Yes	152	71.7
	No	60	28.3

[+]Signifies correct answer

disagreed or disagreed that getting HPV is a serious health issue. The same question was posed on the seriousness of getting cervical cancer. Approximately 90% either strongly agreed or agreed that getting cervical cancer is a serious health issue. Those that strongly disagreed or disagreed represented about 5.2% of the study sample (see Table 4).

Research Question 3

Research question #3: *Do 18- to 26-year-old women believe they are susceptible to getting HPV and cervical cancer?* Subjects were asked if their family history puts them at a greater risk of acquiring HPV and/or cervical cancer. A small portion of the sample (n = 29, 13.6%) either strongly agreed or agreed, while slightly over 50% strongly disagreed or disagreed with the statement. Noteworthy results express that 35.4% were not sure whether their family history put them at an increased risk of getting cervical cancer or HPV (see Table 5).

Table 4

Research Question #2 Results

Survey item	Response	*n*	Percent
Getting HPV is a serious health issue	Strongly disagree	2	.9
	Disagree	7	3.3
	Not sure	32	15.1
	Agree	65	30.7
	Strongly agree	106	50.0
Getting cervical cancer is a serious health issue	Strongly disagree	7	3.3
	Disagree	4	1.9
	Not sure	10	4.7
	Agree	33	15.6
	Strongly agree	158	74.5

Table 5

Research Question #3 Results

Survey item	Response	*n*	Percent
My family history puts me at risk for getting cervical cancer and/or HPV	Strongly disagree	70	33.0
	Disagree	38	17.9
	Not sure	75	35.4
	Agree	16	7.5
	Strongly agree	13	6.1

Research Question 4

Research question #4: *What do 18- to 26-year-old women perceive as barriers to obtaining the HPV vaccination?* To answer this research question, subjects were asked if they thought getting the HPV vaccination series might be unsafe or harmful to their health. In the current study, 15.6% either strongly agreed or agreed and 58.5% either strongly disagreed or disagreed. Noteworthy results express that 25.9% were not sure whether they thought getting the vaccine might be unsafe or harmful to them. To further answer this research question, subjects were also asked if they thought having a lack of insurance would explain why they would not or could not receive the HPV vaccination. About 18.9% of participants either strongly agreed or agreed with the question, while 55.7% strongly disagreed or disagreed that lack of insurance explains why they would not obtain the vaccination (see Table 6).

Research Question 5

Research question #5: *What do 18- to 26-year-old women perceive as benefits to obtaining the HPV vaccination?* Subjects were also asked if they felt that getting regular

Table 6

Research Question #4 Results

Survey item	Response	*n*	Percent
I think getting the HPV vaccination series might be unsafe or harmful to my health	Strongly disagree	79	37.3
	Disagree	45	21.2
	Not sure	55	25.9
	Agree	19	9.0
	Strongly agree	14	6.6
Lack of insurance explains why I cannot or will not get the HPV vaccination	Strongly disagree	88	41.5
	Disagree	30	14.2
	Not sure	54	25.5
	Agree	18	8.5
	Strongly agree	22	10.4

pap screenings is beneficial and can detect HPV and cervical cancer. The majority of the sample (*n* = 179, 84.5%) strongly agreed or agreed with this item, while 6.1% strongly disagreed or disagreed.

When asked about being informed about the benefits of getting the HPV vaccine from a physician or other health care professional, 56.1% of the study sample was uninformed, or answered no to the question. The remaining 43.9% reported that they had been informed about the benefits of receiving the HPV vaccine from a physician or other health care professional (see Table 7).

Research Question 6

Research question #6: *Do 18 to-26-year-old women's knowledge levels and attitudes (i.e., perceived susceptibility, perceived severity, perceived barriers, and perceived benefits) regarding HPV and cervical cancer predict their intention to receive*

the HPV vaccination? As portrayed in Table 8, nearly 26% of women in this sample either

Table 7

Research Question #5 Results

Survey item	Response	*n*	Percent
Getting regular pap screenings is beneficial and can detect HPV and cervical cancer	Strongly disagree	9	4.2
	Disagree	4	1.9
	Not sure	20	9.4
	Agree	44	20.8
	Strongly agree	135	63.7
I have been informed about the benefits of getting the HPV vaccine from a physician or other health care professional	Yes	93	43.9
	No	119	56.1

Table 8

Research Question #6 Results

Survey item	Response	*n*	Percent
I have, or will have received the HPV vaccination series within the next nine months	Strongly disagree	49	23.1
	Disagree	27	12.7
	Not sure	81	38.2
	Agree	13	6.1
	Strongly agree	42	19.8

strongly agreed or agreed that they have or will have received the HPV vaccination series within the next nine months. However, 35.8% strongly disagreed or disagreed that they would receive the vaccine. In addition, 38.2% of participants stated they were not sure if they would receive the HPV vaccine in the next nine months.

A PLUM ordinal regression was computed, to further answer this research question. Ordinal regression is used with ordinal dependent variables, where the independents may be categorical factors or continuous covariates. For this study, the dependant variable was women's likelihood of getting the HPV vaccination series. The independent factors were knowledge levels and attitudes (i.e. perceived susceptibility, perceived severity, perceived barriers, and perceived benefits).

The Cox and Snell was calculated and determined as .047. For the purpose of this study, this means that the independent variables (perceived susceptibility, perceived severity, perceived barriers, and perceived benefits) accounted for 4.7% of the variance in the participants' intention toward getting the HPV vaccination. Table 9 offers a model summary to survey item 20.

In conclusion, this chapter has summarized the results of the research questions posed in this study. In addition, the results of the PLUM ordinal regression statistical analysis were explained in detail.

Table 9

Model Summary for Intention Toward HPV Vaccination

Predictor variable	B	SE B	Wald	*B*
Knowledge	-.081	.091	.791	.374
Perceived severity	.292	.186	2.470	.116
Perceived susceptibility	-.110	.106	1.074	.300
Perceived barriers	-.280	.154	3.281	.070
Perceived benefits	-.139	.136	1.049	.306

CHAPTER V

DISCUSSION

The purpose of this study was to apply the constructs of the Health Belief Model to assess women's knowledge and attitudes (i.e., perceived susceptibility, perceived severity, perceived benefits and perceived barriers) regarding cervical cancer, HPV and the HPV vaccine and determine whether knowledge predicts women's intentions to receive the HPV vaccine. The findings of this study were compared to previous research as portrayed in Table 10 and discussed thereafter.

Research Question #1: Accuracy of Knowledge

Most women in the present study (*n* = 172, 81.1%) reported they had at least heard of the Human Papillomavirus. The remaining 18.9% had not heard of the virus. This result is much lower than previous findings by other researchers, providing some support for the notion that the Utah population is educated, despite its conservativeness.

In a study conducted by Tiro and colleagues (2007), knowledge of HPV was relatively low (*n* = 1,248, 40%) among a sample of women surveyed throughout the United States. This is consistent with additional findings from Holcomb and colleagues (2004). They found that from a sample of more than 250 people, a significant amount of women (*n* = 289, 33%) had never heard of HPV.

In another study, conducted by Moraros and colleagues (2006), only 7% of respondents knew that HPV was a virus or STI. Hoover and colleagues (2000) conducted a study on HPV vaccine acceptability among adolescents, to evaluate HPV knowledge

Table 10

Research Question and Findings Compared to Previous Research

Research question	Study results	Previous research
1. How accurate is 18- to 26-year-old women's knowledge regarding cervical cancer, HPV, and the HPV vaccine?	Most women have heard of HPV and the HPV vaccine. However, they are unsure of its link to cervical cancer and genital warts. They are also unsure of how to decrease their risk of acquiring HPV.	*Agree*: Tiro et al. (2007). Holcomb et al. (2004). *Disagree*: Moraros et al. (2006). Hoover et al. (2000)
2. Do 18- to 26-year-old women believe there are severe consequences to getting HPV and cervical cancer?	Most women in the current study agreed or strongly agreed that there are severe consequences to contracting HPV and cervical cancer.	*Agree*: Hoover et al. (2000). Hopenhayn et al. (2007).
3. Do 18- to 26-year-old women believe they are susceptible to getting HPV and cervical cancer?	Women either disagreed or were unsure about their susceptibility of contracting HPV or cervical cancer, based on their family history.	*Agree*: Ingledue et al. (2004) Denny-Smith et al. (2006).
4. What do 18- to 26-year-old women perceive as barriers to obtaining the HPV vaccination?	In this study, barriers weren't thoroughly determined. Women reported that lack of insurance was not a barrier to getting vaccinated.	*Disagree*: McGarvey et al. (2003).
5. What do 18- to 26-year-old women perceive as benefits to obtaining the HPV vaccination?	Women understand the benefits to getting Pap screenings. However, most reported that they haven't been educated on the benefits to vaccination. Thus, their unsure attitudes exist.	*Disagree*: Hopenhayn et al. (2007).
6. Do 18- to 26 year-old women's knowledge levels and attitudes (i.e., perceived susceptibility, perceived severity, perceived barriers, and perceived benefits) regarding HPV and cervical cancer predict their intention to receive the HPV vaccination?	According to results of the ordinal regression analysis, no significant relationships were found using the constructs of the Health Belief Model (perceived susceptibility, perceived severity, perceived barriers, and perceived benefits).	*Disagree*: Ingledue et al. (2004) Denny-Smith et al. (2006).

and priorities, HPV vaccine acceptability, and willingness to participate in an HPV vaccination clinical trial. Although knowledge of HPV was low in this group, women were very concerned about cervical cancer and genital warts.

There are at least two different factors that most likely contributed to the higher percentage of women who have heard of HPV in the Bear River Health District. First, the national media campaign aimed at promoting the Gardasil vaccine may have attained some level of success in raising awareness. Numerous advertisements have aired on national television, in print and on the internet for the past few years, stating the benefits of the vaccine and the minimal side effects associated with the vaccine.

Second, consistent with the research findings of Sharpe and colleagues (2005), higher knowledge scores may simply be related to a smaller population of lower socioeconomic status women in the Bear River Health District. As defined in the HBM, demographics and sociopsychological factors may play a large role in study outcomes (Rosenstock, 1974). For the present study, it is also crucial to realize that most women had either a high school education or some college. There were very few that reported having less than high school level education.

In the current study, a surprising 62% could correctly answer how HPV is transmitted from one person to another. Although women seemed to be informed about HPV and HPV transmission, an alarming 57.5% could not correctly identify proper ways of decreasing their risk of becoming infected with HPV. One explanation of this result could be due to the wording of the question: How can you decrease your risk of

becoming infected with Human Papillomavirus, and/or possibly confusing response choices;

a. Abstinence (not having sex until married)
b. Having protected sex with a condom
c. Avoid smoking
d. All of the above

Most women reported "Abstinence" as the only correct answer, when in reality, they are all correct. As the literature states, practicing safe sex, regular screening tests, and HPV vaccination are the best ways to prevent the development of cervical cancer (Hayden, 2006).

Although religious demographic data was not collected, this result could possibly be due to the fact that women of the predominant religion, Latter-Day Saints (LDS), have strong beliefs in avoiding sex until marriage. They may feel that avoiding sex until marriage will rid all problems related to sex. Some women even wrote comments such as that on their completed survey, although there was not a request for such comments. Another possibility may be that women felt rushed to complete the survey and simply did not read all the answers in their entirety.

Research Question #2: Perceived Severity

When asked if getting HPV is a serious health issue, more than 80% of participants strongly agreed or agreed that it is a serious health issue. When asked about the seriousness of getting cervical cancer, slightly over 90% of women strongly agreed or

agreed that getting cervical cancer is a serious health issue. This result is consistent with Hoover and colleagues (2000) and Hopenhayn and colleagues (2007). This researcher feels this result is likely due to the nature of the sample, primarily educated White women from a more rural area of the nation.

Research Question #3: Perceived Susceptibility

When asked about family history of HPV and cervical cancer, 13.6% either strongly agreed or agreed, while slightly over 50% strongly disagreed or disagreed that they might be susceptible to HPV and/or cervical cancer. According to the literature reviewed in the present study, few studies support this finding. Nonetheless, Ingledue and colleagues (2004) conducted a study to better understand college women's knowledge, perceptions and preventative behaviors regarding HVPV infection and cervical cancer. This was the only study that applied the Health Belief Model as a theoretical framework in determining perceived seriousness, perceived susceptibility and preventative behaviors regarding HPV and cervical cancer. Relationships between HPV and cervical cancer knowledge and perceived seriousness, perceived susceptibility and preventative behaviors were examined. Using Pearson correlation coefficients, no significant relationship was found to exist between HPV and cervical cancer knowledge and perceived susceptibility to HPV or cervical cancer (r = .020, p = .680). A significant negative correlation was found to exist between HPV and cervical cancer knowledge and perceived seriousness of HPV and cervical cancer (r = -0.242, p = .000), indicating that as knowledge increased, perceived seriousness decreased. The researchers concluded that

college women participating in this study demonstrated low levels of knowledge concerning HPV and cervical cancer while exhibiting high risk sexual behaviors.

The current study can compare to that of Ingledue and colleagues (2004), because no significant relationship was found to exist between knowledge and perceived susceptibility. Although the study design was different among their study, results are still comparable. In the present study, the researcher feels that the high amount of women who strongly disagreed or disagreed, in regards to their personal susceptibility (50%) is somewhat surprising. It is believed that participants may have reported this way, although they did not really know their family history. Likewise, it was surprising to discover that such a high percentage of women were unsure about their family history. It is important to note that women need to know their family history in order to know if they are at risk of acquiring HPV and/or cervical cancer. This is a strong predictor of the disease and may or may not be preventable. However, if women know their risk, ideally they would be more likely to get Pap screenings regularly to avoid acquiring cervical cancer and potential early death.

It is also important to understand that there was only one survey item that sought to determine women's perceived susceptibility in this study. The weakness in the survey instrument helped the researcher conclude that having only one survey item doesn't well reflect the construct of perceived susceptibility.

Research Question #4: Perceived Barriers

When asked what 18- to 26-year-old women perceive as barriers to obtaining the HPV vaccination, this study provided interesting results. To answer this research question, subjects were asked if they thought getting the HPV vaccination series might be unsafe or harmful to their health. In the current study, 15.6% either strongly agreed or agreed and 58.5% either strongly disagreed or disagreed. It is apparent that although many women strongly disagree that the HPV vaccine may be unsafe or harmful, others (n = 55, 25.9%) were still unsure about the vaccine. This supports past and present research that women are still under educated on issues related to cervical cancer, HPV and the HPV vaccine.

Moreover, additional comments were written in by study participants saying that they were receiving mixed messages from the media. For example, one participant mentioned a recent article on MSNBC that stated the HPV vaccine, Gardasil, may have more side effects than are being reported by pharmaceutical companies, physicians, and other health care professionals. The researcher was unable to find any research to substantiate this claim.

To determine potential barriers to obtaining the HPV vaccination, another item asked about insurance availability and if it explained why women could not or would not get the HPV vaccination. Despite findings from McGarvey and colleagues (2003), insurance coverage was not reported as a barrier to receiving women's health care. The researcher presumes that HPV vaccination would be categorized as "women's health care," along with Pap screenings, mammograms, and the like.

A few study participants made note on their survey that lack of insurance should not be a concern to women living in the Bear River Health District, because the HPV vaccine is offered to uninsured women at the Bear River Health Department at minimal or no cost. It is believed that these comments were written by participants who actually took the survey at one of the Bear River Health Department clinics in the district.

Research Question #5: Perceived Benefits

In order to answer this research question, women were asked what they perceived as benefits to obtaining the HPV vaccination. The first question stated, "Getting regular pap screenings is beneficial and can detect HPV and cervical cancer." The majority of the sample (*n* =179, 84.5%) strongly agreed or agreed with this item, while 6.1% strongly disagreed or disagreed. It seems apparent that women are aware of the benefits of screening, but they lack knowledge in other areas of preventative women's health. This is likely due to the media, educational levels, and/or personal values.

The other survey item designed to answer this question read, "I have been informed about the benefits of getting the HPV vaccine from a physician or other health care professional." Results showed that 56.1% of the study sample was uninformed, or answered no to the question. The remaining 43.9% reported that they had been informed about the benefits of receiving the HPV vaccine from a physician or other health care professional. When Hopenhayn and colleagues (2007) conducted a similar study in Kentucky, they found similar results. Women in their study (*n* = 629, 44.4%) had heard

of HPV either through media or their health care professional. This supports the notion that people likely depend on health care professionals for preventative health education.

A possible explanation to this finding is that physicians may have serious time constraints when dealing with their patients. If physicians were able to be more personable and interested in educating women about the vaccines benefits, then women might be more likely to obtain the HPV vaccination series.

Research Question #6: Vaccination Intentions

Survey item twenty asked, "Do 18 to 26- year-old women's knowledge levels and attitudes (i.e., perceived susceptibility, perceived severity, perceived barriers, and perceived benefits) regarding HPV and cervical cancer predict their intention to receive the HPV vaccination"? In order to answer this question, a PLUM ordinal regression was conducted.

Results from the analysis indicate that there were no statistically significant differences or results produced from the present study. This is inconsistent with many studies discussed in the literature reviewed for the current study. Possible reasons for this inconsistent result are explained in further detail in the next section.

Implications for Health Education

Although this study did not conclude with any findings of statistical significance, some important results were identified. These findings are important for health educators and health professionals, specifically those dealing with women.

The most noteworthy data from the current study were that a large number of women (n = 81, 38.2%) are still unsure about their likelihood of getting the HPV vaccination despite their knowledge level. Despite marketing efforts, this study concluded that little education is being provided to women in the heath care setting. It might be due to a number of factors, including time and/or financial constraints.

Another item of interest to the researcher is that women of this sample expressed that they might be somewhat dependent on advice provided by their physician or health care provider. More than half of the women in the study (56%) reported that they had not heard of the vaccine benefits from their health care provider. This is important for health educators in program planning and implementation in order to better collaborate with women's health professionals. Collaboration is utmost important for heath educators, as that is often times the only way to get challenging objectives accomplished.

Another implication discovered in this study is the possible weakness of the theoretical model (HBM) in predicting health behaviors. According to Janz, Champion, and Strecher (2002), one of the most notable weaknesses of the HBM has been inconsistent measurement of the concepts in both descriptive and intervention research. The vast majority of studies using the HBM fail to establish validity and reliability prior to testing the model. Although the survey instrument used in this study was reviewed prior to model testing, there may have been weaknesses in the design that were never identified by the researcher nor the expert panel. It has been advised that researchers should always seek out valid and reliable instruments before they proceed to develop their own. In this study, the researcher designed the survey instrument based on a variety

of others. This may be another weakness in the current study and likely affected the outcomes of this research.

In regards to the survey instrument, the last weakness determined by the researcher is that not all of the HBM constructs had more than one survey item. Janz and colleagues (2002) recommended that multiple items should be developed for each scale or construct in order to avoid measurement error. This includes the addition of behavioral anchors and even items such as self-efficacy and cues to action, both of which were excluded from this study. As was mentioned before, having only one perceived susceptibility survey item simply was not enough to fully reflect this construct of the HBM.

Future Research

Researchers utilizing the HBM should consider using a combination of models or frameworks. This is simply because behavioral outcomes are usually complementary with significant degrees of overlap. Nonetheless, the HBM should be tested as a collection of constructs, not as a collection of equally weighted variables operating simultaneously. Furthermore, future research should be conducted with various groups of women. This study was successful at reaching women in various clinics in the Bear River Health District, but the majority of the sample was White women with some college education.

Nonetheless, as recommended in the previous section, the current survey instrument should be reevaluated and designed to better meet the needs of the HBM.

There are a limited amount of surveys from past research that would aid future researchers in this process.

Additionally, this study required women to self-report their knowledge and attitudes towards cervical cancer, HPV and the HPV vaccine. Self-report measures are always concerning in quantitative research. The researcher of the current study suggests future research geared towards qualitative studies, including the use of focus groups and interviews among women ages 18-to 26-years old.

REFERENCES

Abood, D.A., Black, D.R., & Feral, D. (2003). Nutrition Education Worksite Intervention for University Staff: Application of the Health Belief Model. *Journal of Nutrition Education Behavior, 35*, 260-267.

American Academy of Pediatrics, Committee on Infectious Diseases. (2007). Recommended immunization schedules for children and adolescents. *Pediatrics, 119*, 207-210.

American Cancer Society. (2007). *All about cervical cancer*. Retrieved November 9, 2007, from http://www.cancer.org/docroot/CRI/CRI_2x.asp?sitearea=&dt=8

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Barclay, L., & Murata, P. (2007). *ACIP Recommends quadrivalent HPV vaccine.* Retrieved October 22, 2007, from www.medscape.com/viewarticle/554041

Beatty, B.G., O'Connell, M., Ashikaga, T., & Cooper, K. (2003). Human papillomavirus education in middle and high schools of Vermont. *Journal of School Health, 73*, 253-257.

Bish, A., Sutton, S., & Golombok, S. (2000). Predicting uptake of a routine cervical smear test: A comparison of the health belief model and the theory of planned behavior. *Psychology and Health, 15*, 35-50.

Centers for Disease Control and Prevention. (2006). *Cervical cancer*. Retrieved October 18, 2007, from http://www.cdc.gov/cancer/cervical/

Centers for Disease Control and Prevention. (2007). *Reducing risk of human papillomavirus*. Retrieved October 18, 2007, from http://www.cdc.gov/cancer/cervical/basic_info/reducing_risk.htm

Chandler, S. (2006). On the horizon: Human papillomavirus vaccines. *Contemporary Sexuality, 40*, 9-13.

Denny-Smith, T., Bairan, A., & Page, M.C. (2006). A survey of female nursing students' knowledge, health beliefs, perceptions of risk, and risk behaviors regarding human papillomavirus and cervical cancer. *Journal of the American Academy of Nurse Practitioners, 18*, 62-69.

Ferrante, J.M., Chen, P.H., & Jacobs, A. (2006). Breast and cervical cancer screening in obese minority women. *Journal of Women's Health, 15*, 531-540.

Ferris, D.G., Waller, J.L., Owen, A., & Smith, J. (2008). HPV vaccine acceptance among mid-adult women. *Journal of the American Board of Family Medicine, 21*, 31-37.

Fontaine, K.R., Heo, M., & Allison, D.B. (2001). Body weight and cancer screening among women. *Journal of Women's Health and Gender Based Medicine, 10*, 463-471.

Friedman, A.L., & Shepeard, H. (2006). Exploring the knowledge, attitudes, beliefs and communication preferences of the general public regarding HPV: Findings from the CDC focus group research and implications for practice. *Health Education and Behavior, 34*, 471-485.

Gravetter, F.J., & Wallnau, L.B. (2005). *Essentials of statistics for the behavioral sciences* (5th ed.). Belmont, CA: Wadsworth/Thompson Learning.

Hayden, C. (2006). *2007 Utah's health: An annual review*. Retrieved October 18, 2007, from http://uuhsc.utah.edu/coe/womenshealth/research/womens%20Health%20in%20

Holcomb, B., Motino, B.J., Crawford, K., & Ruffin, M.T., IV. (2004). Adults' knowledge and behaviors related to human papillomavirus infection. *Journal of the American Board of Family Medicine, 17*, 26-31.

Hoover, D.R., Carfioli, B., & Moench, E.A. (2000). Attitudes of adolescent/young adult women toward human papillomavirus vaccination and clinical trials. *Health Care for Women International, 21*, 375-391.

Hopenhayn, C., Christian, A., Christian, W.J., & Schoenberg, N.E. (2007). Human papillomavirus vaccine: Knowledge and attitudes in two Appalachian Kentucky counties. *Cancer Causes Control, 18*, 267-634.

Ingledue, K., Cottrell, R., & Bernard, A. (2004). College women's knowledge, perceptions and preventative behaviors regarding human papillomavirus infection and cervical cancer. *American Journal of Health Studies, 19*, 28-34.

Janz, N. K., Champion, V.L., & Strecher, V.J (2002). *Health behavior and health education: Theory, research and practice* (3rd ed.). Hoboken, NJ: Jossey-Bass.

Ledwaba, T., Dlamini, Z., Naicker, S., & Bhoola, K. (2004). Molecular genetics of human cervical cancer: Role of papillomavirus and the apoptotic cascade. *Biological Chemistry, 385*, 671-682.

Likes, W.M., & Itano, J. (2003). Human papillomavirus and cervical cancer: Not just a sexually transmitted disease. *Clinical Journal of Oncology Nursing, 7*, 271-276.

Mayo Clinic. (2007). *Introduction to cervical cancer*. Retrieved on November 15, 2007, from http://www.mayoclinic.com/health/cervical-cancer/DS00167

McGarvey, E.L., Clavet, G.J., Johnson, J.B., II, Butler, A., Cook, K.O., & Pennino, B. (2003). Cancer screening practices and attitudes: Comparison of low income women in three ethnic groups. *Ethnicity and Health, 8*, 71-82.

Merriam Webster Online Dictionary. (2007). *Squamous cell carcinoma.* Retrieved November 29, 2007, from http://www.merriam-webster.com

Moraros, J., Bird, Y., Barney, D.D., King, S.C., Banegas, M., & Suarez-Toriello, E. (2006). A pilot study: HPV infection knowledge and HPV vaccine acceptance among women residing in Ciudad Juarez, Mexico. *Californian Journal of Health Promotion, 4*, 177-186.

National Cancer Institute. (2007a). *What you need to know about cervical cancer.* Retrieved on October 18, 2007, from http://www.cancer.gov/cancertopics/types/cervical

National Cancer Institute. (2007b). *Surveillance epidemiology and end report*. Retrieved October 25, 2007, from http://seer.cancer.gov

Ostbye, T., Taylor, D.H., Yancy, W.S., & Krause, K.M. (2005). Associations between obesity and receipt of screening mammography, papanicolaou tests, and influenza vaccination: Results from the health and retirement study (HRS) and the asset and health dynamics among the oldest old (AHEAD) study. *American Journal of Public Health, 95*, 1623-1631.

Pichichero, M.E. (2007). Who should get the HPV vaccine? *The Journal of Family Practice, 56*, 197-201.

Robb-Nicholson, C. (2007). A doctor talks about HPV vaccination. *Harvard Women's Health Watch, 14*, 1-4.

Rosenstock, I.M. (1974). Historical origins of the health belief model. *Health Education Monographs, 2*, 328-335.

Sharpe, P.A., Brandt, H.M., & McCree, D.H. (2005). Knowledge and beliefs about abnormal pap test results and HPV among women with high-risk HPV: Results from in-depth interviews. *Women and Health, 42*, 107-133.

Tiro, J.A., Meissner, H.I., Kobrin, S., & Chollette, V. (2007). What do women in the U.S. know about human papillomavirus and cervical cancer? *Cancer Epidemiology Biomarkers Preview, 16*, 288-294.

Wikipedia Online Encyclopedia. (2009). *PLUM ordinal regression.* Retrieved May 3, 2009, from http://www.wikipedia.com

APPENDICES

Appendix A

Women's Health Survey

Women's Health Survey

Answer the following questions honestly and to the best of your ability
Circle only one answer

(1) How old are you?

(2) Are you pregnant?

a. Yes
b. No
c. Don't Know

(3) What is your race/ethnicity?

a. Caucasian
b. Non-white Hispanic
c. African American
d. Asian
e. Multiracial
f. Other

(4) Please circle your highest level of education completed:

a. Less than high school
b. High school
c. Trade school/certification program
d. Some college
e. Bachelor's degree
f. Post graduate degree

(5) Have you heard of the Human Papillomavirus (HPV)?

a. Yes
b. No

(6) How is Human Papillomavirus transmitted from one person to another?

a. Sexual contact
b. Sharing a drink with someone
c. Through needles
d. Don't know

(7) How can you decrease your risk of becoming infected with Human Papillomavirus?

e. Abstinence (not having sex until married)
f. Having protected sex with a condom
g. Avoid smoking
h. All of the above

(8) Human Papillomavirus is linked to genital warts and cervical cancer?

a. True
b. False

(9) How can you prevent yourself from acquiring cervical cancer?

a. Practicing safe sex
b. Getting regular pap test screenings
c. Vaccination
d. All of the above

(10) Have you heard of a vaccine that protects women from becoming infected with common strains of Human Papillomavirus?

a. Yes
b. No

Rate the statements below using the following scale:

1= Strongly Disagree 2= Disagree 3= Not sure 4= Agree 5= Strongly Agree

(11) My family history puts me at risk for getting cervical cancer and/or HPV.
1 2 3 4 5

(12) Getting HPV is a serious health issue.
1 2 3 4 5

(13) Getting cervical cancer is a serious health issue.
1 2 3 4 5

(14) There is always something that holds me back from getting annual Pap screenings.
1 2 3 4 5

(15) Getting regular Pap screenings is beneficial and can detect HPV & cervical cancer.
1 2 3 4 5

(16) I think getting the HPV vaccination series might be unsafe or harmful to my health.
1 2 3 4 5

(17) I believe in the innovative HPV vaccine as a means to prevent HPV infection.
1 2 3 4 5

(18) I have, or will have received the HPV vaccination series within the next nine months.
1 2 3 4 5

(19) Lack of insurance explains why I cannot or will not get the HPV vaccine.
1 2 3 4 5

(20) I have been informed about the benefits of getting the HPV vaccine from a physician or other health care professional?

a. Yes
b. No

Thank you for your time and honesty. This research will help in improving women's health education!

Appendix B

Letter of Information

LETTER OF INFORMATION
Determining the Knowledge & Attitudes of Women Regarding Cervical Cancer

Introduction/Purpose: Assistant Professor Phillip Waite in the Department of Health, Physical Education and Recreation at Utah State University (USU) and Ashlee Cooper, Research Assistant, are conducting a research study to find out more about women's beliefs regarding the new vaccine predicted to prevent certain strains of Human Papillomavirus (HPV), which may lead to cervical cancer. Women who are between the age of 18-26 will be asked to participate because they fall into the target population of women who should be getting this vaccine Approximately 210-225 participants will be involved in this study.

Procedures: If you agree to participate in this research, you will be asked to complete an anonymous survey which may take approximately five minutes to complete. Please do not put your name or any identifiable information on this survey. When you have completed the survey, please put it in the envelope provided and seal it and then place it in the drop box located in the main office at the front desk. If you are pregnant you will not be asked to participate because the vaccine is not recommended for pregnant women at this time.

Risks: There is minimal risk in participating in this study. However; if you have concerns you may ask questions to your physician.

Benefits: Participation in this research may not have a direct benefit to you at this time; however, the researchers may be able to collect information which may assist health professionals to better understand women's attitudes towards their health and possibly determine their intentions to get vaccinated against HPV.

Voluntary Nature of Participation and Right to Withdraw without Consequence: Participation in this study is entirely voluntary. You may withdraw at anytime without consequence.

Confidentiality: No personal identifiable information is being asked. The survey is completely anonymous and no one will know how you answered the questions. Placing the completed survey in the envelope provided and sealing it will allow us to keep this study anonymous.

IRB Approval Statement: The Institutional Review Board for the protection of human participants at USU has approved this research study. If you have any questions or concerns about your rights, you may contact the IRB at (435) 797-1821.

Phillip J. Waite, Ph.D.
Major Professor
(435) 797-7217

Ashlee Cooper, BS, CHES
Student Researcher
(435) 757-5547

Appendix C

Letter to Participants

Dear Cache Valley Women's Center:

My name is Ashlee Cooper and I'm a graduate student of Utah State University. I am strongly interested in determining the knowledge, attitudes and beliefs of 18-26 year old women in the Cache Valley area regarding the new HPV vaccination series that is predicted to prevent HPV and cervical cancer. This research would be used for a Master's Thesis in the Department of Health, Physical Education and Recreation.

Ideally, my hopes are to administer a brief, confidential and anonymous survey to your patients at the Cache Valley Women's Center. This survey would be completed, voluntarily, as the patient fills out their medical history/update forms in your waiting room. This research would begin in February 2008 and conclude in May 2008 if all goes as expected. Again, these surveys would be anonymous and used for research purposes only.

Patients would be given an Informed Consent Form and be made aware of the purpose of the study prior to completing the survey. I strongly believe this process is possible, but would require some commitment from the front office staff (gathering and keeping track of surveys) and I am willing to work with you in any way possible.

In summary, understanding the knowledge, attitudes and beliefs of 18-26 year old women in Cache Valley is significant in order to improve women's health issues in our community. I would be happy to meet with you during your regularly scheduled staff meetings or another appropriate time to answer further questions that you may have. I look forward to your response and hope you will strongly consider the proposed research study.

Sincerely,

Ashlee Cooper, BS, CHES
Graduate Assistant
Department of Health, Physical Education & Recreation
Cell: 435-757-5547
E-Mail: a.cooper@aggiemail.usu.edu

Appendix D

Student Wellness Center Letter of Approval

Utah State University

STUDENT HEALTH SERVICES
850 East 1200 North
9100 Old Main Hill
Logan UT 84322-9100

June 18, 2008

To : The Department of Health, Physical Education and Recreation
Utah State University

Re: Ashlee Holguin research project

I have discussed Ashlee's research project: Determining the Knowledge and Attitudes of 18 to 26 year-old Women Regarding Cervical Cancer, HPV, and the HPV Vaccine and have agreed to allow Ashlee to conduct her research questionnaire with the student/patient population of the USU Student Health and Wellness Center. We look forward to working with Ashlee and support her quest for this contribution to this important health issue for the women of our campus.

Our staff will assist her in administering the questionnaire and gathering the information for her study.

Best Regards:

Jim Davis, M.D.
Director

Telephone: (435) 797-1660 • Fax: (435) 797-3585

Appendix E

Cache Valley Womens Center Letter of Approval

Gary K. Fowers, MD
Barry A. Noorda, MD
David A. Kirkman, MD
Anne S. Blackett, DO

The comfort of home, the care of professionals

Deborah R. Flansburg, CNM
D'Anne Moon, CNM
Kenneth A. Wade, PAC

CACHE VALLEY
Women's Center

April 28, 2008

Dear Ashlee:

Thank you for your interest in conducting research at the Cache Valley Women's Center. Your proposal sounds very exciting to our team of health professionals. We understand you are wanting to determine the knowledge and attitudes of 18-26 year old women regarding the HPV vaccine, and their likelihood of getting the vaccine.

As the office manager, I will do my best to assist you in this process and ensure the completed surveys are kept safely in my office until you come to pick them up. I also understand the importance of getting women to complete the surveys and will do my best to encourage people to fill them out along with their medical history update forms; whether it be mailed to them or they complete it in the office.

Thanks again for your interest in improving women's health locally. We look forward to the results of this thesis research study.

Sincerely,

Deborah Wood

Deborah Wood
Office Manager
Cache Valley Women's Center
(435) 753-9999
cvwomenscenter@yahoo.com