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Assessment Of An Educational Intervention To Increase Knowledge And Intention To Take HPV Vaccine And Cervical Cancer Screening In Nigeria

Chigozie Anastacia Nkwonta
University of South Carolina

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ASSESSMENT OF AN EDUCATIONAL INTERVENTION TO INCREASE
KNOWLEDGE AND INTENTION TO TAKE HPV VACCINE AND CERVICAL
CANCER SCREENING IN NIGERIA

by

Chigozie Anastacia Nkwonta

Bachelor of Nursing Science
Madonna University, 2008

Master of Nursing Science
University of Ibadan, 2013

Submitted in Partial Fulfillment of the Requirements

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College of Nursing

University of South Carolina

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Accepted by:

DeAnne K. Hilfinger Messias, Major Professor

Tisha Felder, Committee Member

Nathaniel Bell, Committee Member

Kathryn Luchok, Committee Member

Cheryl L. Addy, Vice Provost and Dean of the Graduate School

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DEDICATION

I dedicate this dissertation to my Dad, Mum, sisters and brother. It has been a long, arduous journey, but finally I can see the light at the end of the tunnel. To my Dad who has always been my cheerleader and my champion. He told me that the world is my oyster and I can achieve whatever I set my mind. To my Mum, for challenging me to succeed against all odds. To my sisters Tochi, Chidiebere, and Onyinye, they have been my backbone and life support throughout my career. To my baby brother, you have always reminded of my responsibilities.

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ABSTRACT

Nigeria has some of the highest rates of cervical cancer morbidity and mortality in sub-Saharan Africa. Both the human papillomavirus vaccine (HPV) and cervical screening are effective prevention strategies against both HPV infection and cervical cancer. Lack of awareness, limited knowledge, limited decision-making agency, lack of spousal support and stigma are barriers to uptake of these preventive measures. Given patriarchal structures and norms through which men control family resources and dominate decisions, male involvement in initiatives aimed at improving sexual and reproductive health is necessary. Community-based health education is an effective intervention to improve knowledge and reduce stigma. The aim of this research was to evaluate the impact of an educational intervention on awareness, knowledge, intention to take HPV vaccination and cervical screening, and reduce stigma among men and women offered at 12 urban community locations in Nigeria. This is a pre-test and post-test study that employed two community-based health education interventions; a face-to-face presentation delivered in group settings and printed pamphlet delivered to individuals. A total of 266 participants within 18 and 65 years participated.

At baseline, the majority (80%) of all participants had low levels of knowledge of HPV and HPV vaccine and 21% had limited knowledge of cervical cancer and cervical screening. The proportion of participants with poor knowledge of HPV and cervical cancer reduced significantly at post-intervention in both groups. Our results showed that less than 12% of all participants had ever received HPV vaccine and screening. There was

significant increase in the participants' intention to take and to encourage a family member to receive HPV vaccination and cervical cancer screening. Of note, knowledge of HPV as a sexually transmitted infection was associated with high levels of stigma, which increased after exposure to the intervention.

The research supported the effectiveness of the community-based educational intervention in promoting the increasing awareness, knowledge and intention to take HPV vaccine and cervical screening among urban-dwelling Nigerian adults. Study findings are important for informing future gender-comprehensive and context-specific programs activities that seek to engage men in reducing HPV infection and cervical cancer in Sub-Saharan Africa. Further research is warranted to assess the factors contributing to ongoing stigma and to develop effective interventions to reduce stigma among Nigerian adults.

TABLE OF CONTENTS

DEDICATION.....	iii
ACKNOWLEDGEMENTS.....	iv
ABSTRACT.....	vi
LIST OF TABLES.....	ix
LIST OF FIGURES.....	xi
LIST OF ABBREVIATIONS.....	xii
CHAPTER 1: INTRODUCTION.....	1
CHAPTER 2: MALE PARTICIPATION IN REPRODUCTIVE HEALTH INTERVENTIONS IN SUB-SAHARAN AFRICA: A SCOPING REVIEW.....	16
CHAPTER 3: EFFECT OF A COMMUNITY-BASED EDUCATIONAL INTERVENTION ON AWARENESS, KNOWLEDGE AND INTENTION TO TAKE HPV VACCINATION AND CERVICAL CANCER SCREENING IN NIGERIA	39
CHAPTER 4: ADDRESSING STIGMA AND IMPROVING HPV AND CERVICAL CANCER KNOWLEDGE AMONG MEN AND WOMEN IN NIGERIA: ASSESSMENT OF A COMMUNITY-BASED EDUCATIONAL INTERVENTION	71
CHAPTER 5: CONCLUSION AND RECOMMENDATION.....	94
REFERENCES.....	101
APPENDIX A: INFORMED CONSENT FORM.....	124
APPENDIX B: QUESTIONNAIRE FOR MEN.....	126
APPENDIX C: QUESTIONNAIRE FOR WOMEN.....	130

LIST OF TABLES

Table 3.1: Summary of Participant Demographics.....	49
Table 3.2. Participant Knowledge of HPV and HPV Vaccine Pre- Intervention and Post- Intervention.....	51
Table 3.3 Participant Knowledge of Cervical Cancer and Cervical Cancer Screening Pre- intervention (Pre) and Post intervention (Post).....	53
Table 3.4: Participants Level of Knowledge of HPV, HPV Vaccine, Cervical Cancer and Cervical Cancer screening Pre and Post intervention.....	54
Table 3.5: Participant HPV Vaccine and Cervical Cancer Screening Rate.....	55
Table 3.6. Participant Intention to Encourage and or Take HPV Vaccine.....	56
Table 3.7. Participant Intention to Encourage and or Take Cervical Cancer Screening.....	57
Table 3.8: Participant Regression Analysis of Factors Associated with Higher Knowledge of HPV and HPV Vaccine.....	59
Table 3.9: Participant Regression Analysis of Factors associated with Lower Knowledge of Cervical Cancer and Cervical Cancer Screening.....	60
Table 4.1: Summary of Participants' Characteristics.....	79
Table 4.2: Participants' Knowledge of HPV and HPV Vaccine.....	81
Table 4.3. Participants' Knowledge of Cervical Cancer and Cervical Cancer Screening.....	82
Table 4.4: Participants Knowledge of HPV, HPV Vaccine, Cervical Cancer and Cervical Cancer Screening Pre- and Post.....	83
Table 4.5. Participant Perception of Stigma Associated with HPV Infection and Cervical Cancer.....	85
Table 4.6: Participant Regression Analysis of Factors Associated with Higher Knowledge of HPV and HPV Vaccination.....	86

Table 4.6: Participant Regression Analysis of Factors Associated with Higher Knowledge of Cervical Cancer and Screening.....87

LIST OF FIGURES

Figure 1.1: Proposed Modified Theory of Gender and Power.....	11
Figure 1.2: Modified Precaution Adoption Process Model.....	12

LIST OF ABBREVIATIONS

CDC	Centers for Disease Control and Prevention
CHW	Community Health Workers
HPV.....	Human Papillomavirus
HSA.....	Health Surveillance Assistants
ICPD.....	International Conference on Population and Development
IgG	Immunoglobulin G
NPC.....	National Population Commission
PAPM.....	Precaution Adoption Process Model
SSA	Sub-Saharan Africa
STI.....	Sexually Transmitted Infection
TGP	Theory of Gender and Power
UNFPA.....	United Nations Population Fund
UNICEF.....	United Nations Children's Fund
VIA	Visual Inspection with Acetic Acid
WHO.....	World Health Organization

CHAPTER 1

INTRODUCTION

Background

Human Papillomavirus (HPV) refers to small, double-stranded DNA viruses with more than 150 identified types. Each virus is classified according to their oncogenic potential into low-risk and high-risk HPV types (Centers for Disease Control and Prevention, [CDC] 2017). HPV is the most common sexually transmitted infection, commonly spread through intimate skin-to-skin contact by having vaginal, anal, or oral sex. HPV transmission from hands to genitals or genitals to hands have also reported for both sexes and heterosexual couples (Liu, 2016). HPV has been found to be resistant to heat and desiccation, therefore non-sexual transmission of the virus is possible (Ault, 2006). HPV is so common that most sexually active men and women will be infected with at least one type of HPV at some point in their lives. It is difficult to detect when an individual first became infected with HPV as symptoms can develop years after infection (CDC, 2017).

The vast majority of HPV infection is asymptomatic and will clear without medical intervention; but those who contract persistent high-risk HPV types may develop cancer. HPV is estimated to cause about 5% of human cancers (de Martel et al., 2012; Bosch et al, 2013), including anogenital cancers (cervical, vaginal, vulvar, penile, and anal) and oropharyngeal cancer (CDC, 2017). The prevalence of HPV among general population is unknown in Nigeria but studies had reported 42.9% of women in a state in the northern

region (Aminu et al., 2014) and 26.3% of the general population in Southern Nigeria had HPV-IgG antibodies (Aminu et al., 2014; Bruni et al., 2014; Okolo et al., 2010). Furthermore, the age-specific prevalence revealed that 52% of Nigerian women ≤ 30 years had an HPV infection compared to 23% of women who were older than 45 years (Akarolo-Anthony et al., 2014).

HPV infection is responsible for more than 90% of cervical cancers (CDC, 2017), and Nigeria has one of the most extensive epidemics of cervical cancer in sub-Saharan Africa (Ferlay et al., 2014; Oguntayo et al., 2011). Cervical cancer is the second most common female cancer in many parts of Nigeria (Oguntayo et al., 2011), with a high incidence and mortality rates. On average, one Nigerian woman dies of cervical cancer every hour (Federal Ministry of Health [FMoH], 2014). The age-standardized incidence rate of cervical cancer is 34.5 per 100,000 (Ferlay et al., 2014). There is an upsurge in invasive cases, as retrospective studies in three tertiary hospitals in three different regions (Jos, Zaria, and Nnewi) of the country, found that more than 70% of the patients presented with advanced stage cervical cancer (Ikechebelu, Onyiaorah, Ugboaja, Anyiam, & Eleje, 2010; Musa et al., 2016; Oguntayo et al., 2011).

Even with the reported high burden of cervical cancer in Nigeria, accurate morbidity and mortality rates are unknown, due to gross underreporting, misdiagnosis, suboptimal record keeping and improper data from poorly funded cancer registries. It is predicted that there will be 19,440 new cervical cancer cases and 10,991 cervical cancer deaths by 2025 in Nigeria (Ferlay et al., 2014). The risk of HPV infection and cervical cancer can be significantly reduced by HPV vaccination, Pap smear, Visual Inspection with Acetic Acid (VIA) and HPV test.

Prevention

HPV Vaccine. HPV vaccines have fostered the hope of eradication of HPV infection and cervical cancer. The two types of HPV vaccines, Gardasil™ and Cervarix™ provide protection against HPV infection. Gardasil is a quadrivalent vaccine that protects against HPV types 6, 11, 16, and 18, while Gardasil-9 is a nine-valent HPV vaccine that protects against HPV types 6, 11, 16, 18, 31, 45, 52, and 58 (CDC, 2016). Cervarix is a bivalent vaccine that gives protection against HPV types 16 and 18. The World Health Organization (WHO) recommends HPV vaccines for boys and girls aged 9 through 26 (WHO, 2014), while Center for Disease Control and Prevention recommends HPV vaccination for preteen girls and boys at age 11 or 12 years and teens and young adults who did not start or finish the vaccine series until they are 27 years old for women and 22 years old for men. Two doses of HPV vaccine at least six months apart was recommended for 11- to 12-year-olds, and a three doses series is recommended for teens and young adults who start the vaccine later than ages 15 (CDC, 2016).

The 2015 HPV vaccination guidelines by the American College of Obstetricians and Gynecologist Committee do not recommend testing for HPV DNA prior to vaccination in any population group; recommend vaccination among individuals who test positive to HPV DNA and do not recommend routine pregnancy testing before HPV vaccination. However, the guidelines warn that HPV vaccine should not be taken in pregnancy. HPV vaccination is recommended for women regardless of sexual activity status (Munoz, et al. 2010; Paavonen, et al. 2010); for individuals who did not receive the vaccine at an early age, and for men and women with compromised immune systems (including people living

with HIV/AIDS) through age 26, if they did not get fully vaccinated when they were younger (CDC, 2014).

Cervical Cancer Screening. HPV vaccination is projected to reduce substantial prevalence of specific HPV 16/18 infections, cervical abnormalities and invasive cervical cancer, if population coverage is high above 70% (WHO, 2009). Once in a lifetime screening, performed by women in their 30s or 40s could reduce the risk of cervical cancer by 25-30% (WHO, 2014). The implementation of Pap smear, Visual Inspection with Acetic Acid (VIA) and HPV screening is essential for detecting the HPV virus and early cell changes on the cervix. Pap smear and VIA facilitates early detection and successful treatment of precancerous cervical lesions. Pap smear is recommended for all women between the ages of 21 and 65 years old (CDC, 2016). Women who are 30 years old or older are encouraged to have an HPV test along with the Pap smear (CDC, 2016). The HPV test is a “qualitative multiplex assay that simultaneously provides specific genotyping information for HPV types 16 and 18, and a pooled result of 12 high risk strains of HPV DNA” (Roche Molecular Inc., 2014, p.10). HPV tests eliminates the need for an initial pelvic exam by providing women an opportunity to collect samples of their own vaginal cells for testing (Arbyn et al, 2014). With normal pap test results, a woman is expected to wait for three years before repeating another Pap test (CDC, 2017; Ronco et al., 2014). With normal HPV test and Pap test results, a woman can wait as long as 5 years before getting another screening test (Ronco et al., 2014), as her chances of getting cervical cancer in the next few years is very low (CDC, 2017).

The World Health Organization (WHO), together with CDC and other health organizations included visual inspection with acetic acid (VIA) and treatment with

cryotherapy in the cervical cancer screening guidelines as screening methods for cervical cancer in low-resource settings (WHO, 2013; CDC, 2015). VIA involves staining the cervix with a 5% acetic acid (vinegar) solution, and an abnormal cervical tissue turns white after 30 to 60 seconds. VIA has helped increase the detection of precancerous cells by increasing screening coverage in some developing countries (WHO, 2012; Quentin et al., 2011; Nessa et al., 2010; Zhang et al., 2010; Mwanahamuntu, et al., 2011; Mwanahamuntu, et al., 2013). In Nigeria, the uptake of cervical cancer screening is extremely low, as fewer than 10% of Nigerian women have ever had a cervical cancer screening (Idowu, Olowookere, Fagbemi, & Ogunlaja, 2016; Wright, Aiyedehin, Akinyinka, & Ilozumba, 2014). Poor uptake of cervical cancer screening was documented even among health providers in Lagos Nigeria, where 60% of the nurses reported never having been screened for cervical cancer (Awodele et al., 2011).

Barriers

The low uptake of HPV vaccine and cervical cancer screening in Nigeria is exacerbated by multiple personal, social, political and institutional factors. Reported barriers include: lack of awareness of the vaccine; poor knowledge of disease and screening techniques; erroneous perceptions, cultural beliefs and practices; fear of pain from the procedure; fear of the outcome of the test; lack of decision making ability and spousal support; stigma and modesty, the cost of screening, barrier to access, associated costs, deficiencies within the health care system and health facilities (Ezenwa, Balogun, & Okafor, 2013; Lim & Ojo, 2017; Modibbo, et al., 2016; Ndikom, Ofi & Omokhodion, 2014). Even among urban and educated Nigerian women, the level of awareness and

knowledge of cervical cancer were found to be low (Hyacinth, Adekeye, Ibeh & Osoba, 2012).

With prevention and early detection, HPV infection and cervical cancer are largely avoidable diseases. The incidence of HPV infection and cervical cancer are very high in Nigeria due to poor uptake of cervical cancer screening measures and HPV vaccine. Cervical cancer has a profound societal impact as it mainly affects women between the ages of 30 to 50, who are often raising or supporting families (Goumbri, Domagni, Sanou, Konsegre, & Soudre, 2009). Although cervical cancer affects only women, HPV affects both men and women equally. A woman's risk of contracting HPV infection and subsequently developing cervical cancer does not depend on her sexual behavior alone, but also on her male partner(s)' sexual activities, as men are both vectors and carriers of HPV. Lack of spousal support, stigma and modesty are social barriers that are beyond the control of the woman and require the involvement of men.

The impact of sociocultural factors, including lack of spousal support, is widely recognized as hindering the uptake of cervical cancer preventive measures (Ezeonwu, 2014; Modibbo et al., 2016). This is not surprising, given that Nigeria is a male-dominated society where men are in charge of economies, are the sole family decision-makers, and women are subservient to male family members (Ifemeje & Ogugua, 2012; Lim & Ojo, 2017). Only 15% of Nigerian women have a personal bank account (Council, 2012); only one-third of currently married women participate in household decisions; only 40% of married women participate in decisions about their own health and 50% do not participate in any decisions made in the household (National Population Commission and ICF International, 2014).

Since the mid-1990s, the importance of involving men in reproductive health programs has gained increasing recognition, along with attention to the sociocultural factors affecting women's reproductive health. The World Health Organization (2006) recommended involving men in the prevention of cervical cancer in middle and low-income countries. Studies conducted in developing countries have suggested that lack of male involvement may be an overlooked obstacle to cervical cancer screening (Kim et al., 2012; Lim & Ojo, 2017; Lyimo & Beran, 2012). Men play critical roles in women's abilities to seek health care, yet, more often than not, they are uninformed about both their own and women's reproductive health needs. Despite the role men play in their partners' reproductive health experiences, HPV and cervical cancer programs in Nigeria have focused only on women in reducing the incidence of HPV and cervical cancer; and little attention has been devoted to the social factors that expose women to HPV infection, and/or hinder them from taking the preventive measures.

As will be discussed in more detail in Chapter 3, prior research has shown that increasing awareness and knowledge of HPV, HPV vaccination, and cervical cancer, and cervical cancer screening has been effective in increasing both behavioral intention and behavior (Wright, Kuyinu, & Faduyile, 2010; Ndikom, Ofi, Omokhodion, & Adedokun, 2017). The aim of this research was to implement an educational intervention, delivered using two strategies: one that could be efficiently delivered to groups in natural settings such as churches, and one that could be delivered to individuals who may not be accessible in group settings in order to reach as many people in the target population as possible. Members of the target population who are *accessible and amenable* to a community-based group intervention versus a community-based individual intervention likely have

meaningfully different sociodemographic characteristics and, possibly, differing baseline knowledge and beliefs about HPV, cervical cancer, and the associated risk reduction methods. Thus, the overall purpose of this study is to establish the feasibility of delivering group and individual interventions to the target population, and to test the independent outcomes of each intervention rather than on comparing the two interventions.

Study Aims and Research Questions

The primary aim of this research was to determine the effectiveness of a community-based educational intervention delivered in groups or to individual men and women living in an urban area of southeastern Nigeria. The goal was to increase knowledge of HPV infection and cervical cancer, and intention to take and or encourage HPV vaccine and screening. Specific research questions were:

For each community-based educational intervention strategy:

- What is the level of knowledge of HPV and cervical cancer at post-test versus pre-test?
- What is the intention to take and or encourage HPV vaccine and cervical cancer screening at post-test versus pre-test?
- What is the stigma associated with HPV and cervical cancer at post-test versus pre-test?
- What variation in knowledge of HPV and cervical cancer were observed among participants based on age, marital status and educational level at post-test versus pre-test?

Theoretical Framework: The Theory of Gender and Power (TGP) was selected to guide the exploration of male participation in cervical cancer prevention and the need for an educational intervention, considering the low awareness, poor knowledge and low uptake of HPV vaccine and cervical cancer screening. In addition to TGP, the Precaution Adoption Process Model guided the study.

TGP is a social structural theory that explore the depths of sexual inequity, gender and power imbalance (Connell, 1987). Connell identified three major structures that characterize the gendered relationships between men and women: the sexual division of labor, the sexual division of power, and the structure of cathexis. The three major structures are less evident in the institutional level but remain largely intact at the societal level over a long period, even as society slowly changes.

The sexual division of labor refers to occupational differentiation by gender (Connell, 1987). Nigerian women are generally assigned to lower paying jobs, positions and salaries or relegated to non-income generating labor such as housework, taking care of farmland, childrearing, and caring for the dependent member of the family. This type of work does not have assigned economic wages, so women often earn nothing from doing them. This makes them financially dependent, relying on men for all their needs; thus, constraining women and limiting their economic potential and career paths. These gender-determined roles and discriminatory practices relegate Nigerian women to domestic work, unequal pay for comparable work, prescribed behaviors and expectations, and power imbalance within relationships (Ifemeje & Ogugua, 2012).

The sexual division of power deals with the inequalities in power between men and women. This structure at the household level is maintained by social practice, such as

through the abuse of authority, control in relationships and marginalization of women (Wingood & DiClemente, 2000). Nigerian culture reinforces women to see themselves as the lesser gender, be more submissive and subordinate to the male gender (Nnadi, 2013). The recent National Population Commission report revealed that only one-third of currently married Nigerian women participate in household decisions, and nearly four in ten married women participate in decisions about their own health care. Half of the married women do not participate in any decisions made in their home (NPC & ICF International, 2014). Gender power inequality, especially in the form of relationship power imbalances, plays a role in sexually transmitted infection (Smith, 2007).

The structure of cathexis, also referred to as the structure of social norms and affective attachment, addresses the affective nature of relationships between men and women. It dictates appropriate gender role, the sexual expectations and prescribed behaviors of each gender at the societal level. This structure describes the constrained expectations the society has for women regarding their sexuality, and consequently, shapes their perceptions and limits their experiences of reality.

The prescribed cultural gender roles limit communication and shared decision making among couples especially on sexually related matters (Dunkle et al., 2007). Sexual related issues are deemed sensitive and are rarely discussed in most Nigerian communities, which often affect communications in marriage, thus hindering women's expression of self, request of what they want and discussion of their reproductive health with their spouses.

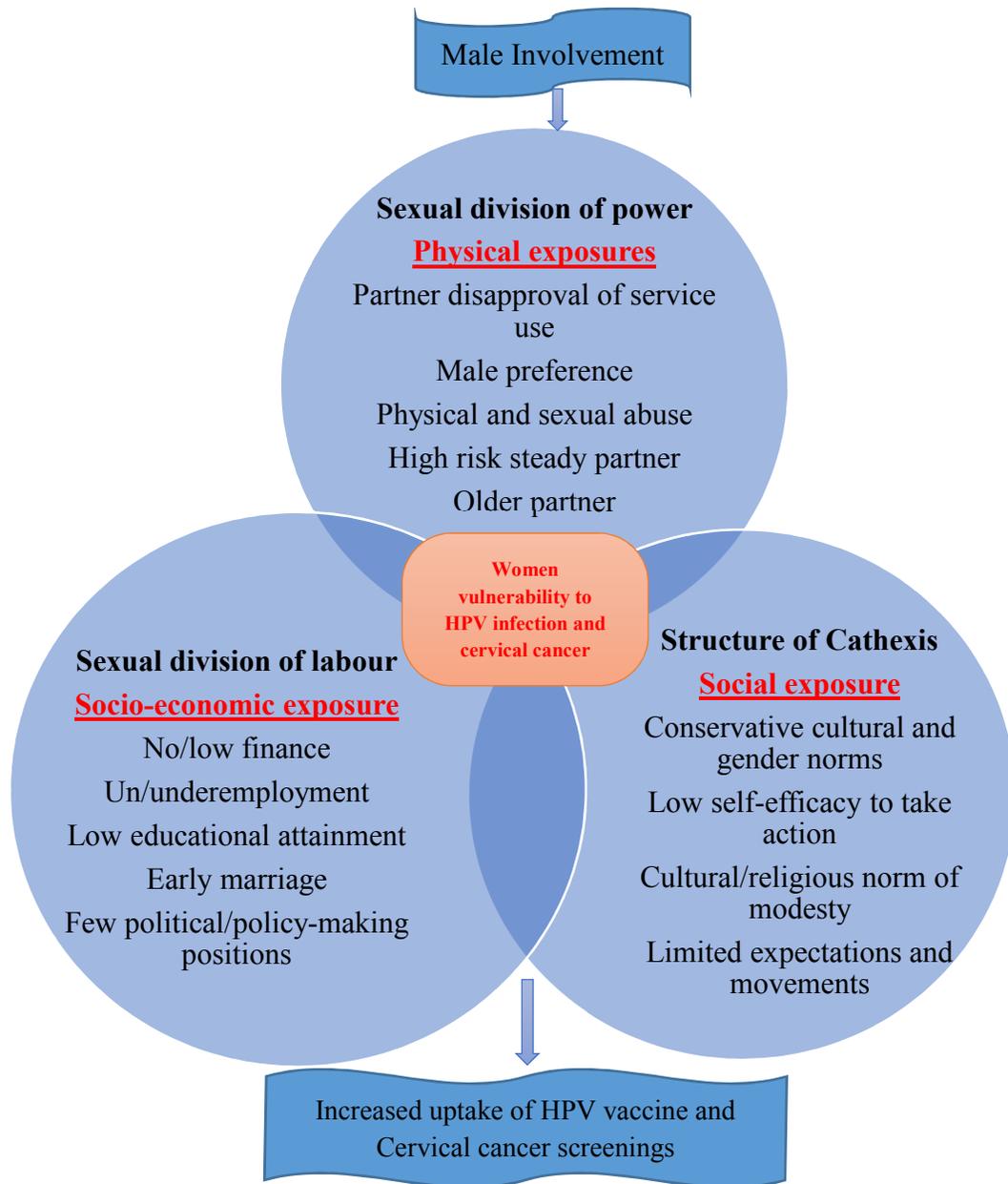


Figure 1.1: Proposed Modified Theory of Gender and Power

Methodological Model. The Precaution Adoption Process Model (PAPM) explains how a person comes to decisions to take action and how he or she translates that decision into action (Weinstein & Sandman, 1992). The adoption of a new behavior or precaution or cessation of an unhealthy behavior requires deliberate steps unlikely to occur outside of conscious awareness. The model identifies seven stages along the path from lack of awareness to maintenance of action over time. Given that this research only focused on

knowledge and intention to take HPV vaccine and Pap smear, only the first five stages of the PAPM apply. Figure 1.2 illustrates the application of the five stages of the Precaution Adoption Process Model to this research, with the aim of increasing the knowledge of HPV and cervical cancer, and intention to take HPV vaccine and cervical cancer screening.

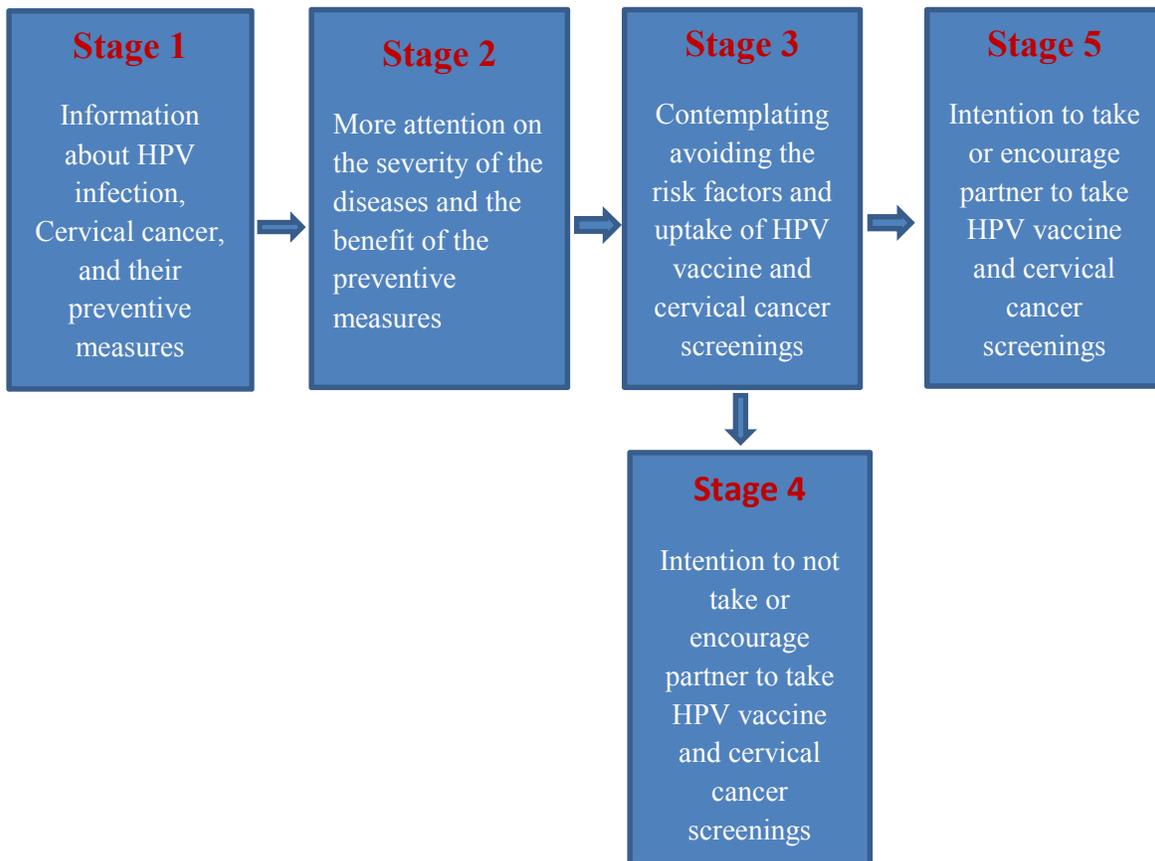


Figure 1.2: Modified Precaution Adoption Process Model

Stage 1 represents the initial point in time when people become aware of HPV infection and cervical cancer. Awareness is the first step to developing an attitude or belief about an issue. Individuals who have never heard of HPV infection and cervical cancer, cannot have formed opinions or beliefs about the disease or preventive measures. Creating awareness on HPV and cervical cancer is vital in building knowledge. Stage 2 represents the point at which individuals first receive information or learn about the HPV infection and cervical cancer, although they are not yet engaged by this information. Being aware of

a disease or its preventive measures increases the possibility of developing an opinion about them. However, people will think about an issue or develop an opinion depending on the level of awareness or the quality of information known. In terms of this research, the educational interventions are designed to both create awareness and provide participants with information on HPV, cervical cancer, HPV vaccine and cervical cancer screening. The aim is to encourage participants to think about both the disease and the available preventive measures.

Providing adequate information stimulates thoughts about the issue, and people begin to consider the issue and have an opinion about it, represented in Stage 3. It is quite common for people to be aware of an issue without being personally engaged with the issue. When they become engaged, they begin to think of assuming a position. Furthermore, people who have a definite position on an issue decide either to take or not to take action. The outcomes of Stage 3 (decision making time) will vary depending on individual differences. Some people may suspend judgment and remain in stage 3 for some time. Others may decide not to take action (Stage 4). Deciding not to take action means halting the precaution adoption process at least for the time being. Deciding to take action by adopting the precaution is represented in Stage 5. Whichever position an individual assumes results in overconfidence in one's beliefs; searches for evidence to favor one's beliefs, interpretations of data to favor beliefs; and insufficient adjustment of beliefs in light of new evidence (Klayman, 1995). One factor that influences people's decision regarding HPV vaccination is perceived susceptibility (Connor & Norman, 1995). The aim of the educational interventions was to enhance participants' recognition of their or their

family members' susceptibility to HPV infection and cervical cancer risk. The following chapter contains the research plan.

Overview of Manuscripts and Target Journals

This dissertation is organized in the manuscript format. The aim of this research was to assess if a community-based educational intervention delivered to men and women living in an urban area of Nigeria would increase the knowledge of HPV infection and cervical cancer, increase intention to take HPV vaccine and screening, and reduce stigma about HPV infection and cervical cancer. The community-based health education intervention included participants who received a face-to-face presentation on HPV infection, cervical cancer, HPV vaccination and cervical cancer screening (Presentation Group) and individual participants who read a pamphlet containing similar information (Pamphlet Group). A total of 281 men and women between the age of 18 and 65 years who could- read and write in English and resided in Anambra state participated in the study. The survey instrument, a self-administered survey, was given to the participants before and after the intervention.

Data analysis consisting of descriptive statistics (frequency and percentage) inferential statistics (T-test, Chi-square and logistic regression) were done using Statistical Analysis System (SAS) software. This study is significant in many ways and has importance to diverse audiences. The findings from this study may assist governments and Non-governmental organizations in planning interventions to increase HPV vaccination and cervical cancer screening in Nigeria. In addition, program planners and researchers may build on the findings or use the findings to guide future research on HPV and cervical cancer.

The first manuscript is a scoping review of male participation in reproductive health interventions in sub-Saharan Africa. The manuscript emphasizes men's shared responsibility and active involvement in sexual and reproductive behavior as an important step in improving reproductive and maternal health. The review synthesis examined and describes the outcome of men's participation in various reproductive health programs such as family planning, birth preparedness, dual protection from HIV/sexually transmitted infections (STI), and maternal health service utilization carried out between 2007 and 2018 in Sub-Saharan Africa. This manuscript has been submitted to the International Perspective on Sexual and Reproductive Health Journal.

The next two manuscripts describe the effectiveness of the community-based health education intervention in improving knowledge of HPV and cervical cancer, increasing intention to take HPV vaccine and cervical screening and reducing HPV and cervical cancer stigma among men and women in Nigeria. The first manuscript details the changes in awareness, knowledge and intention to take to HPV vaccination and cervical cancer screening before and after the educational intervention. (Chapter 3). The manuscript will be submitted to the International Journal of Public Health. The second manuscript describes an evaluation of educational intervention to reduce stigma associated HPV and Cervical cancer in Nigeria. The target journal for this manuscript is the Global Public Health Journal.

CHAPTER 2
MALE PARTICIPATION IN REPRODUCTIVE HEALTH INTERVENTIONS IN
SUB-SAHARAN AFRICA: A SCOPING REVIEW

Background

Over the past two decades, there has been only minimal improvement in women's reproductive health indicators in the African region (WHO, 2014). Reproductive and sexual health problems represent one-third of the total global burden of disease for women between the ages of 15 and 44 (WHO, 2013). Maternal mortality rates in the region are among the highest in the world, with nearly half of the estimated 830 daily maternal deaths occurring in sub-Saharan (Alkema et al., 2016). Hypertension during pregnancy (e.g., pre-eclampsia and eclampsia), complications from delivery, unsafe/unattended abortion, and postpartum hemorrhage and infections account for nearly 73% of all maternal deaths worldwide (Say et al., 2014). Over the past 20 years, the maternal mortality rate in Africa has declined only 2.7%, yet the maternal mortality rate needs to continue to decline at least 5.5% per year in order to reach the Millennium Development Goal 5 of universal access to reproductive health with a 75% reduction in the maternal mortality rate and in the African region (WHO, United Nations Department of Public Information [UNICEF], United Nations Children's Fund [UNFPA], The World Bank, 2012). Given that between 1990 and 2010 the total rate of decline was only 2.7%, it is clear that persistent challenges to improved maternal health are not being adequately addressed.

Persistent gender, social and ethnic disparities continue to inhibit progress in women's health across the globe (International Conference on Population and Development [ICPD], 2014). In Sub-Sahara Africa, gendered cultural beliefs and practices, and limited access, affordability, and utilization of health facilities contribute to women's health disparities. Culturally, men are the decision makers and gatekeepers in most African families and therefore hold power and influence over decisions regarding women's access

to health services, contraception and prevention of sexually transmitted infections (STI). Furthermore, men often control the allocation of money, transportation, time and permission women need to access health services.

The importance of involving men in reproductive health programs has gained increasing recognition since the mid-1990s, and there is increasing recognition that men's participation in reproductive and sexual health is an important step in supporting women's health and improving family health. Formally recognized at the 1994 International Conference on Population and Development, at the 1995 Women's International Conference in Beijing, three avenues for men's active inclusion and shared responsibility in women's health were identified: (1) promoting men's use of contraceptives through increased education and distribution; (2) involving men in roles supportive of women's sexual and reproductive decisions; and (3) encouraging men to indulge in responsible sexual and reproductive practices to prevent and control STIs (United Nations Department of Public Information, 1995; UNFPA, 2004).

Researchers have explored the importance of men's involvement in women's decision-making and use of reproductive health services in Sub-Saharan Africa in various studies using a wide range of research designs and methods. An assessment of women's sex preference, decision making and fertility control in the Ekpoma community in south southern Nigeria showed that more than half of the women believed it is the man's right to make the final decisions in the home including reproductive decisions (Agatha, Sims, & Godfrey, 2007). Similarly, an examination of the motivations and preferences of rural Nigerian women undergoing cervical cancer screening indicated the most frequently reported motivating factors of women's participation in cervical cancer screening were the

support and opinion of her husband and the community leaders (Chigbu, Onyebuchi, Ajah, & Onwudiwe, 2013). Not surprising, in studies conducted in both Burkina Faso Sawadogo, Gitta, Rutebemberwa, Sawadogo, & Meda, 2014) and Nigeria (Ezeonwu, 2014; Modibbo, 2016), lack of spousal support was identified as one of the reasons for women not being screened for cervical cancer.

Recognizing the sociocultural factors exposing women to a higher risk of contracting sexual transmitted infections, the Joint United Nations Programme on HIV/AIDS (UNAIDS, 2010) called for development and implementation of innovative strategies to further educate men about women's health. To further strengthen and promote the recommendation of male involvement in reproductive health interventions, it is imperative to examine the impact of male involvement in reproductive health interventions (family planning, sexual risk behaviors, antenatal care, birth preparedness, maternal health). Reproductive health program planners and researchers have employed various interventions involving men in an effort to improve reproductive health and increase the utilization of reproductive health services. Examples include invitation letters, home visits, community events and use of community health workers. The previously published reviews on male participation in women's health issues in Sub-Saharan Africa focus on prevention of mother-to-child transmission of HIV, HIV counselling and testing, HIV reduction barriers and facilitators as opposed to interventions to improve reproductive health (Auvinen, Kylma, & Suominen, 2013; Burton, Darbes, & Operario, 2010; Hensen, Taoka, Lewis, Weiss, & Hargreaves, 2014; Morfaw, et al., 2013). The specific aim of this scoping review was to examine evidence published between 2007 and 2018 related to evaluation of reproductive health interventions that involved men in efforts to improve

reproductive and maternal health in Sub-Saharan Africa from 2007 to 2018. This review is of interest to health care providers, researchers and public health planners concerned with reproductive health issues, particularly among women in Sub-Saharan Africa, but also in other regions of the globe.

Methods

We conducted multiple searches through Google Scholar, PubMed, Science Direct, Medline, Global Health, PsycInfo and Cumulative Index to Nursing and Allied Health Literature. Search terms were related to *male involvement* (i.e., male, men, spouse, couple, involvement, participation, engagement, program, trials, spouse; couple) in *reproductive health issues* (i.e., family planning, sexual risk behaviors, antenatal care, birth preparedness, maternal health, reproductive health, maternal health, sexual health; family planning; antenatal care, condom use, birth preparedness) in Sub-Saharan Africa (i.e., Nigeria, Malawi, Ethiopia, Tanzania). Once retrieved, articles were further screened using the following inclusion criteria: (1) articles published in English between January 2007 and March 2018; (2) reports of reproductive health interventions involving men in Sub-Saharan Africa; and (4) reports of research that employed an experimental or quasi-experimental study design. Subsequent to the identification of relevant sources, the reference list of each identified article was reviewed to identify additional eligible studies (three articles were included). Excluded were reports of programs that only addressed prevention of mother-to-child transmission of HIV and HIV counselling and testing.

The initial electronic bibliographic search yielded titles of 2,847 articles, including 1,313 duplicates which were subsequently excluded. An examination of the titles of the remaining 1,534 articles resulted in further exclusion of 1,275, yielding a sample of 259

research reports that met the inclusion criteria for full-text review. Of these, 18 articles met the criteria and were submitted to independent review by a second independent examiner, who independently examined all 18 full texts and confirmed all manuscripts met the inclusion criteria. Subsequently, the following information from each study was entered into a Microsoft Excel database: title, authors, publication date, intervention-publication interval, sample characteristics, location, study design, type of reproductive and/or maternal health program, data collection method(s), comparison group, outcome measures, intervention characteristics (i.e., number and types of intervention strategies, outcome measures), and intervention strategies (i.e., individual or couple-based approaches). One person extracted, and both reviewed; and reviewers discussed any disagreements in the data extracted.

Results

The final sample consisted of 18 interventions articles were published between 2007 and 2018, each of which included an evaluation of men's involvement in a reproductive health intervention in Sub-Saharan Africa. The articles included research conducted in Nigeria (n=6), Malawi (n=5), Tanzania (n=3), Uganda (n=2), Ethiopia (n=1), Senegal (n=1), Kenya (n=1) and Mozambique (n=1). Couples, men living with female partners, and men only were the most common target group (17); one study involved only women with information focused on men and encouraged women to deliver the information. The majority of the participants were 18 years of age and above, although six studies included participants as young as 14 and 15 years. The reproductive health outcome measures were family planning (n=9), maternal health/service utilization (n=8), HIV counselling and testing (n=4), birth preparedness (n=1), dual protection from HIV/STI

(n=1) and uptake and adherence of antiretroviral therapy (n=1). The research designs included surveys, interviews and focus groups. Five studies included a theory-based intervention to assess impact of male involvement in reproductive health (Adeleye & Okonkwo, 2016; Adeleye, Aldoory, & Parakoyi, 2011; Exner et al., 2009; and Hartmann et al., 2012; Shattuck, et al., 2011). Overall, the study designs reported in the articles were 12 quantitative, 1 qualitative, and 5 mixed methods studies.

Intervention Theoretical Framework and Design

The most common theoretical frameworks were Gender Theory and the Information-Motivation-Behavioral Skills Model. Adeleye & Okonkwo, (2016) and Adeleye, Aldoory, & Parakoyi, (2011) employed the Gender Theory to explore maternal health services utilization. Gender Theory posits that gender constitutes the social, economic, and political contexts that guide particular beliefs, norms, and behaviors. In their research conducted in Malawi, Shattuck, et al., (2011) and Hartmann et al., (2012) employed the Information-Motivation-Behavioral skills model which postulates that health-related information, motivation, and behavioral skills are important determinants of whether a family planning behavior is performed. Exner et al., (2009) used the Stages of Change Model to guide the intervention to promote dual protection against HIV/STI.

In terms of research design, there were three randomized controlled trials (RCTs), eleven studies that employed a pretest/posttest design and four studies that were posttest-only. Furthermore, eight studies had a comparison group and fifteen studies used at least three intervention strategies. In this review, 10 studies were couple-based interventions, seven studies targeted only men and one study targeted only women. The couple-based interventions were focused on family planning, HIV counselling and testing and maternal

health services utilization. The studies that targeted only men explored HIV/STI dual protection, maternal health services utilization, birth preparedness and family planning. Interestingly, one study had only women as the study participants, and the purpose was to assess the women's perspectives about the impact a maternal health mass media campaign had on their husbands. Almost all the studies assessed the impact of male involvement in marriage relationships and/or co-habiting relationships. Nine studies were conducted in urban settings, eight studies were conducted in rural settings and one study involved participants residing in both urban and rural settings.

Intervention Content and Outcomes

Uptake of family planning services was the primary outcome measure in the majority of the studies (n=9), followed by maternal health service utilization (n=6). Collectively, these studies indicated that inclusion of men in reproductive health interventions is an essential component of effective reproductive health interventions in Sub-Saharan African.

Men's Willingness to Participate

Studies conducted in Nigeria, Ethiopia, and Uganda evaluated men's willingness to participate and complete the reproductive health programs. The reports indicated high participation and retention among their participants. The use of local culture and gender roles to improve men's involvement in maternal health, Adeleye, Aldoory, and Parakoyi, (2011) reported that about 90% of the participants attended nine group health talks which averaged 2 hours in duration and were conducted over in 4-week period in Nigeria. In similar study in Nigeria, more than 90% of the respondents had attended a two-hour educational session on maternal death (Adeleye, Aldoory, & Parakoyi, 2011). Exner and

colleagues (2009) observed that the majority (91 %) of the men who participated in a program to increase dual protection against HIV/STI attended two five-hour sessions scheduled one week apart, and 75% attended both monthly two-hour ‘check-in’ sessions post-intervention (Exner et al., 2009).

Furthermore, among couples who participated in a family planning intervention aimed at encouraging spousal communication, 92% of the couples responded to face-to-face discussions (Tilahun, Coene, Temmerman, & Degomme, 2015). Similarly, Ghanotakis and colleagues (2016) reported 65% of male participants attended all 10 sessions focused on transforming gender norms and encouraging uptake of family planning and HIV services. Interestingly, nearly all participants reported complete trust in the credibility of the information shared and high satisfaction with the workshop. These findings challenge the conventional assumptions and stereotypical perceptions that most African men are not interested in participating in programs involving women’s health and healthcare services (Chipeta, Chimwaza, & Kalilani-Phiri, 2010; Olawoye et al., 2005). These findings clearly suggest African men are willing to participate in reproductive health programs, either individually or with their partner/spouse and provide further support for the notion that providers, researchers and program planners should be attentive and actively respond to opportunities to include men in reproductive health programs and services.

Couple-Oriented Interventions

There were ten examples of reproductive health interventions designed for married or co-habituating partners. The focus of these interventions was either family planning uptake (Hartmann, Gilles, Shattuck, Kerner, & Guest, 2012; Shattuck, et al., 2011; Tilahun, Coene, Temmerman, & Degomme, 2015; Becker, et al., 2014; Lemani, et al., 2017) or

maternal health (i.e., obstetric care, antenatal care, skilled birth attendance) alone or with HIV counselling and testing and or gender norm transformation (Jefferys, et al., 2015; Byamugisha, et al., 2011; Bright, et al., 2015; August, Pembe, Mpembeni, Axemo, & Darj, 2016; Mushi, Mpembeni, & Jahn, 2010). Intervention contents namely, education, counseling, behavioral skills, home visits, follow-up visits and community events were all efficacious strategies that resulted in positive outcomes.

Further, community-engaged and collaborative approaches such as community-based participatory research (CBPR) were defining characteristics of these programs to generate meaningful outcomes. Trained community health workers (CHWs) were used in six studies, to provide the community interventions (Hartmann, Gilles, Shattuck, Kerner, & Guest, 2012; Becker, et al., 2014; Lemani, et al., 2017; August, Pembe, Mpembeni, Axemo, & Darj, 2016; Mushi, Mpembeni, & Jahn, 2010; Audet, et al., 2016). In these instances, CHWs were members of the local community, without formal professional health training. They were referred to by a variety of terms, including promoters, traditional birth attendants, male champions, community health counselors, community agents, lay providers, and peer support specialists. For example, August and colleagues employed and trained trusted men and women who had completed primary school and could read and write in the villages to identify pregnant women in the community and make at least four visits to the family throughout the pregnancy (August et al, 2016). Similarly, health surveillance assistants, stratified by sex and catchment area, visited women from their catchment areas in their homes and counseled them on family planning alone and with the male partner. The Health Surveillance Assistants (HSA) would then initiate the family

planning method of the woman's choice if the woman asked for a short-term method or refer her to the nearest facility for long-term family planning methods (Lemani et al, 2017)

Utilization of community-based approaches to health promotion and prevention may reduce the challenges of standard research approaches, strengthen the rigor and utility of science for community applicability, enhance evidence-based translation to local communities, and demonstrate both individual and community benefit (Horowitz, Robinson, & Seifer, 2009). For example, Audet and colleagues (2016) conducted a community participatory action program in Mozambique that integrated and deployed CHWs to the community to engage men in prenatal care services and increase HIV testing and treatment uptake. The CHWs established a male-friendly clinical environment and provided couples counseling sessions. The CHW intervention increased male accompaniment at antenatal care appointments, HIV testing among pregnant woman, male partner presence at antenatal visits, maternal attendance at a minimum of three antenatal appointments, and slight decreased median gestational age at first antenatal care visit. Partner accompaniment to antenatal care was associated with higher odds of health facility delivery, but little difference in odds of anti-retroviral treatment initiation (Audet et al., 2016).

Benefits of CHW engagement include their familiarity with local issues, existing rapport with community members, and circumvent the problem of a scarcity of other human resources. Becker and colleagues (2014) reported on the utilization of a pair of CHWs in Malawi to provide family planning and or HIV counseling and testing in a single home visit to couples. They reported that more than 75% of the women and men visited by CHWs subsequently received their first HIV test and about 60% of couples tested

subsequently reported they discussed the results of their HIV test as a couple. The results also indicated a significant increase in condom use during the most recent sexual intercourse, and there were no reported incidents of serious violence among any of the couples at the one-week follow-up visit. In a similar study in Malawi, women who received couples counseling training were more likely to have their partners present during subsequent counseling and to receive condoms at their first family planning visit (Lemani et al., 2017).

Other reported outcomes of CHW interventions include improved community perception, acceptability and utilization of obstetric care among couples (Mushi et al. 2010). Mushi and colleagues used community-based safe motherhood promoters to improve the utilization of obstetric care in a rural district of Tanzania. Findings included a significant increase in early antenatal booking by primigravida mothers, in the number of primigravida women attending at least one antenatal visits and in the proportion of women who delivered with skilled attendants. In addition to antenatal care attendance at least once during pregnancy by all the women, the number of respondents who were able to mention at least three pregnancy risk factors and cite at least three practices that contribute to delay in seeking obstetric care increased significantly (Mushi et al. 2010). In Tanzania, CHWs delivered a Home-Based Life Saving Skills training for pregnant women. The CHWs made a minimum of four visits to the family during the period of the woman's pregnancy. Women who received the CHW visits had increased levels of knowledge of potential danger signs during pregnancy, childbirth, and postpartum. Also, a higher proportion of men accompanied their partner/wives to prenatal care visits and a higher proportion of

women were involved in shared decision-making about place of delivery (August et al., 2016).

Given that CHWs are trained to provide the culturally and context-specific advocacy and engage in the reciprocal exchange of information within familial social contexts, these findings are not surprising. CHWs serve as vital links, bridges, and in-between people, brokering between the world in which they and their neighbors live and the healthcare system (Norris et al., 2006). Similar results were reported in CHW-delivered family planning intervention studies in Malawi and in Ethiopia. A Randomized Controlled Trial on couples' family planning communication in Malawi used five visits to provide information, motivation, and behavioral skills to intervention group participants. The intervention was delivered by a male motivator over 6 months. As compared to the control group, intervention group participants reported a significant increase in contraceptive use, in ease and frequency of discussing family planning with their partners, the use of joint process for deciding to use family planning, and reduced differential couple communication (Hartmann et al., 2012). The authors added that the frequency with which men discussed family planning with their wives was a significant predictor of family planning uptake. Tilahun and colleagues (2015) measured spousal communication and family planning uptake among couples in Ethiopia. They reported a positive association between the intervention and use of contraception among those who were not using contraceptives at baseline, and higher levels of husbands' involvement and spousal discussion on family planning. However, no significant difference in contraceptive use was found between the intervention and control arms. These findings provide further evidence that CHWs programs may be more successful in community-based, participatory models,

in which community members and healthcare and other agencies have shared values, equity, planning and participation (Norris et al., 2006).

In all ten of these studies, regardless of the type of reproductive health program, intervention strategy, or duration of intervention, male involvement in couples-orientated programs was efficacious. Three studies employed formal written invitation letters to incentivize male participation in women's reproductive health (Jeffreys et al., 2015; Byamugisha1 et al., 2011; Bright et al., 2011). In Tanzania, Jeffreys and colleagues (2015) used written invitations to motivate male partners to attend joint antenatal care and couple voluntary counselling and testing. They reported 81% of the couples that attended a joint antenatal care session received voluntary couple counselling and testing, and 71% reported an improved relationship between with their partner. Beyond improved couple communication and support, 96% of the women noted improved decision-making regarding antenatal care, family planning and sexual and reproductive health (Jeffreys et al, 2015).

Similarly, in Uganda, Byamugisha and colleagues (2011) reported the positive effect of written invitation letter on couple antenatal attendance and partner acceptance of HIV testing. More than 90% of males who attended the antenatal clinic visit with their wives accepted HIV counselling and testing. Similarly, in Nigeria, male partners of antenatal attendees who accepted an invitation to be part of a three-day participatory training on female reproductive health and family planning showed a remarkable increase (90%) in knowledge of methods of contraception and a higher proportion of men who expressed intent to use family planning in the future. At follow-up with 50 couples, all

male participants reported improved spousal communication on family planning (Bright et al., 2015).

Interventions designed for men-only

There were seven examples of interventions delivered exclusively to men, without the presence of partners or spouses (Adeleye, Aldoory & Parakoyi, 2011; Exner et al., 2009; Ghanotakis et al., 2016; Shattuck et al., 2011; Adeleye & Okonkwo, 2016; Okigbo, Speizer, Corroon, & Gueye, 2015). The content of these programs included family planning, birth preparedness, dual protection from HIV/STI, and maternal health improvement. Assessment of these interventions examined the level of men's participation, their adoption of the specific intervention, and level of spousal influence on the adoption of the intervention by their wives. Various approaches to engage men were employed, including peer-delivered interventions, male-friendly clinics, and active engagement of community leaders. There is increasing recognition of the power and influence of peer education in health promotion and illness prevention.

Peer-delivered educational interventions are important to involve and engage men in reproductive health initiatives given the complex nature of relationships and societal pressures. The reported peer-led interventions resulted in greater positive changes in contraceptive uptake, and HIV service uptake. For example, post-assessment of a peer-delivered educational intervention designed to encourage contraceptive use among Malawian men and to foster communication about family planning with their partners, demonstrated a significant increase (78%) in male intent to use family-planning methods among men in the intervention arm compared to 59% in the of the comparison arm. Additionally, a significant increase using family-planning methods with their wife and

intended to continue for 2 years; and overall communication about family planning with their partner (Shattuck et al, 2011).

Similarly, in Uganda, peer educators delivered a community-based intervention to improve family planning, HIV service uptake, and transform harmful gender norms (Ghanotakis et al., 2016). Men who received the intervention reported higher levels of seeking clinic services for self, condom use with main partners over the past three months, having an HIV test, communicating with main partners on family planning method, and accompanying a partner to the clinic in the past five months (Ghanotakis et al., 2016). Given the wide recognition of peer education as an approach in communicating behavioral changes especially in addressing HIV pandemic, these findings are not surprising (Harris, Smith & Myer, 2000). Furthermore, health education and outreach by peers, community health workers, and local community and religious leaders are cost-effective community health promotion strategies that utilize local human resources.

Community and religious leaders are vital community members in Sub-Sahara Africa, where collectivism is a way of living and community leaders' opinions are an important factor in women's utilization of health services (Chigbu, et al., 2013). These leaders are key stakeholders who can effect changes through advocacy, effective mentorship, policy change, and seeking the support of benevolent community members and organizations to improve community resources. Male community leaders in Nigeria were motivated to act as change agents and encouraged other men to assist with maternal health in their community after being engaged in group health talks to improve maternal health (Adeleye, Aldoory, & Parakoyi, 2011). Okigbo and colleagues (2015) reported similar findings in their assessment of a family planning program that was positively

associated with men reporting increased use of modern contraception in Kenya, Nigeria and Senegal. The program involved religious leaders in television programs, print media, and community events aimed at increasing men's exposure to family planning messages and modern contraceptive use.

Furthermore, Nigerian men who had female partners were mobilized to increase dual protection against HIV/STI, which produced notable outcomes. The participants were one-third less likely to engage in unprotected sex in the prior 3 months, approximately four times more likely to report condom use at last sexual intercourse with their main partner, and approximately seven times more likely to correctly identifying venues for HIV testing. Additional outcomes included: men's partners were 10 times more likely to have been tested for HIV/STI, the men had lower expectations that condoms would be associated with a negative response in the context of their primary relationship, and the men held significantly less stigmatized beliefs about HIV-infected people (Exner et al., 2009).

Male engagement in healthy sexual behaviors is essential to ensure the sexual and reproductive health of women, girls, and families. Men are increasingly encouraged to participate in improving maternal health because of their role as family gatekeepers. An educational session on maternal deaths among married men in Nigeria showed large improvement in their knowledge of family planning methods for females, facilities for antenatal care and delivery, and key warning signs of maternal death (Adeleye & Okonkwo, 2016). Additionally, there was increased willingness to provide money and encourage partners to seek care. One of the key strategies to reduce maternal death and increase safe motherhood is birth preparedness (Acharya, Kaur, Prasuna, & Rasheed, 2015). Birth preparedness includes knowing danger signs, planning for a birth attendant

and birth location, arranging transportation, identifying a blood donor, and saving money in case of an obstetric complication (Acharya, Kaur, Prasuna, & Rasheed, 2015). Although, Ibrahim et al., (2014) reported that a behavioral intervention had no statistically significant impact in the levels of birth preparedness among married men in Nigeria, they did observe other positive behavioral changes among husbands who participated. These behavioral changes included: encouraging their wives to attend antenatal clinic, accompanying their wives to the clinic, reducing their wives' household chores, taking care of their wives' basic needs, granting their wives permission to seek health care when ill, taking their wives to the health facility when ill, donating blood when it was needed, and regularly providing traditional medicine for their wives (Ibrahim et al., 2014).

It is important to note that one way to reach men is to provide strong encouragement for women to share key health messages and information with their partners. Indirect involvement of men may be a way to enhance maternal health in Africa. For example, Zamawe, Banda, and Dube (2015) assessed the impact of a maternal health mass media campaign aired in Malawi and found a significant relationship between women's exposure to the radio campaign and an increased likelihood that their husbands were involved in maternal health issues, including participating in antenatal care, being involved in childbirth and participating in postnatal care.

Discussion

This review presents the current state of the science related to male involvement in reproductive health interventions in Sub-Saharan Africa from 2007 to 2018. The salient findings indicated male involvement is a feasible and effective strategy for improving family planning usage, utilizing maternal health services, participating in HIV counselling

and testing, changing some harmful gender-based norms, and reducing risky sexual behaviors. There is clear evidence from the existing research that male community and religious leaders are willing to be advocates and change agents and involved in women's health issues. Therefore, it is important that reproductive health programs are adapted to and organized in line with the community local culture to enhance acceptance, adoption and utilization. In most Sub-Saharan nations, individuals are strongly engrained in social and cultural practices, norms, and expectations, which limits control and freedom for self-expression, requiring submissiveness, especially from women and girls. This gender power inequality plays a role in sexual and reproductive health.

The findings from this review showed that men are willing to participate in reproductive health programs, which contradicts the stereotypically assumptions and perception that African men are often uninterested in reproductive health and that reproductive health responsibilities are solely the role of a woman (Chipeta, Chimwaza & Kalilani-Phiri, 2010). Men are important partners in reproductive health, considering the increasing emphasis on social determinants of health. The socio-cultural factors, especially in relation to gender inequality, in developing countries makes this review very vital for health providers, program planners and health organizations to be actively engaged in creating and sustaining initiatives to include men in women's health promotion. Based on the literature analyzed, increased and enhanced male participation will support women's health choices and encourage shared decision making.

This analysis showed that irrespective of the duration of intervention, involving men in various reproductive health programs is an important strategy in improving family planning knowledge and uptake, HIV knowledge, counselling and testing, maternal health

services use, spousal communication. In addition, involving men in reproductive health programs reduced risky sexual behaviors and lessened their beliefs and reported behaviors some harmful gender-based norms. The increased positive outcomes observed in this analysis may be due to increased willingness and participation among the participants which potential explains the improved retention of key messages, increased acquisition of behavioral skills, increased communication among partners/couples and increased men's accompaniment. Increased knowledge about sexual health is associated with attitude changes, which have been shown to influence behavior and practice (Davidson et al. 1985). These findings corroborate others' reports that providing men with information on healthy maternal and reproductive health practices may encourage both the men and women to adopt the behaviors, increase use of services, and support partners' choices (Onyango, Owoko, & Oguttu, 2010; Steinfeld et al., 2013; Wambui, Ek, & Alehagen, 2009).

Furthermore, there is clear evidence that the mobilization of men as partners in reproductive health is very vital in reducing the spread of sexually transmitted infections. Men who participated in the HIV/STI interventions were more likely to have higher safe sex self-efficacy, use condoms and be tested for HIV/STIs. This review is especially pertinent in Sub-Saharan Africa, where evidence suggests that many women are contracting STIs such as HIV within the context of their primary relationships (Hirsch, et al., 2007). The observed changes could be due to increased knowledge of the risk of unsafe sexual practices on men and their partners and changes in attitude. The degree to which these male participation interventions improved reproductive health depended on many factors such as the number and type(s) of interventions implemented, the implementation strategies, the quality of implementation, the type of outcome indicator(s) and the outcome

measures. As observed in this review, increased contact is very important in increasing the effectiveness of reproductive health interventions as almost all the studies had at least three contacts with the participants, which were mostly the initial contact, continuing visits and follow up contact. This is in line with the recommendation by WHO (2003).

This review highlights the fact that male involvement can be enhanced through home-based intervention delivery, friendly facility-based service delivery, and engagement with trained CHWs. It is well known that CHW engagement and the provision of home-based services are effective strategies to expand coverage and increase accessibility and availability of services to people living in resource-constrained areas (Mushi et al., 2010; Audet et al., 2016). These approaches are necessary in Sub-Saharan Africa, where a large proportion of the low-income populations live more than one hour away from a health facility (Pearson & Shoo, 2005). This finding corroborates other studies that used trained CHWs to improve maternal health outcomes (Homer et al., 2014; Lane & Garrod, 2016).

It is important to note that findings from this review suggest that men's involvement may not significantly impact certain indicators of reproductive health interventions, such as birth preparedness, and widespread gender-based norms (i.e., equal decision-making power) in Sub-Saharan Africa. Interestingly, regardless of the lack of significant difference with the primary outcome measures reported in few of the studies, there were positive changes in other contributing factors like freedom to access care, increased spousal communication and financial and emotional support. Several confounding factors may inhibit the outcome of an intervention, which may not have been considered during the planning phase. These include the type of marriage/relationship, educational levels, financial capabilities of individuals, families, and communities, and religious beliefs. For

example, a clear evidence of religious barriers to male involvement in birth preparedness was observed by Ibrahim and colleagues (2014). In addition, polygamous marriages or non-cohabiting relationships may contribute to limited success of birth preparedness as men in these contexts may have competing needs or be less engaged with expectant mothers. The lack of significant effects on birth preparedness may also be a consequence of lack of spousal communication and lack of couples' joint antenatal attendance, thus resulting in limited exposure of men and women to the benefit of birth preparedness. These findings suggest that others socio-demographic barriers must be considered when involving men in interventions to promote birth preparedness.

This review corroborates other calls for the recognition of the importance of men's involvement in reproductive health, especially in developing nations. Given the evidence that men's involvement in reproductive health programs contributes to positive health and social impacts, it is important to create and implement specific strategies aimed at enhancing the involvement of both men and women in reproductive and family health initiatives and in informing policy recommendations and programmatic planning to improve reproductive health in Sub-Saharan Africa.

Limitations and Recommendations

To our knowledge, this is the first review to examine the effects of male partners participation in reproductive health interventions in Sub-Sahara Africa and therefore is an important contribution to the literature. These findings are limited to the available literature accessible through major search engines within the past eleven years (2007 – 2018). Other limitations include the exclusion of all literature published in languages other than English and research that did not employ an experimental design. The decision to exclude non-

experimental designs reflected the aim of exploring the impact of men's engagement in reproductive health issues. Thus, the review is restricted to an assessment of men's participation in reproductive health. Another potential limitation is that a single author reviewed the individual papers for inclusion into the review.

These findings do provide the basis for several recommendation for future research on male involvement in reproductive health in Africa and in developing nations. Further research on male knowledge, attitudes, and involvement in reproductive health issues and interventions within Sub-Sahara Africa clearly is warranted. Further research is needed to support scale up of the best practices for involving men in further reproductive health. Other area for further research include the assessment of specific mechanisms aimed at enhancing male participation in reproductive health initiatives.

Conclusion

The evidence provided in this review clearly supports the recommendation that involving men in reproductive health is essential to improving the health of women, men, and families in Sub-Sahara Africa. There is clear evidence of the individual, family, and community benefits of involving African men in reproductive health programs and services. Involving men should not be limited to reproductive health programs and services but also incorporated into efforts related to cervical cancer prevention, poverty alleviation, and infant/child nutrition. Reproductive health programs should be gender comprehensive and context-specific by bringing men to the table as equal partners rather than considering their presence as a barrier. More research is warranted to support and strengthen the findings of this review and to build evidence to support the sustainability and scaling-up of male participation interventions in various health programs.

CHAPTER 3

EFFECT OF A COMMUNITY-BASED EDUCATIONAL INTERVENTION ON
AWARENESS, KNOWLEDGE AND INTENTION TO TAKE HPV VACCINATION
AND CERVICAL CANCER SCREENING IN NIGERIA.

Introduction

Worldwide, human papillomavirus (HPV) infection is the most common sexually transmitted viral infection of the reproductive tract. HPV infection is so common that the majority of sexually active men and women will be infected with at least one type of HPV at some point and may have recurrent infections (Center for Disease Control [CDC], 2017). Globally, the prevalence of HPV infection in women is 11–12%, with a much higher rate of 24% in Sub-Saharan Africa (Forman, et al., 2012). At least 20% of women with normal cervical cytology in Sub-Saharan Africa are infected with carcinogenic HPV genotypes (De Vuyst et al., 2013). Nigeria is among the Sub-Saharan nations with high rates of HPV-related diseases (Bruni, et al., 2018). Although there are currently no specific estimates of HPV prevalence among the general population in Nigeria, available data from various studies conducted in different cities and states indicate a high prevalence of HPV among women. For example, a seroprevalence of 42.9% for IgG antibodies to HPV was reported among women attending the reproductive health clinic in Zaria, a city in the northern region (Aminu et al., 2014). Other researchers reported HPV infection rates of 30.4% and 36.5% among women who attended the outpatient clinics of a university teaching hospital in Lagos, South-West Nigeria (Adegbesan-Omilabu, 2014; Okunade, et al., 2017).

Clinical challenges to identifying and tracking HPV infection include the fact that it is difficult to detect the point at which an individual first became infected with HPV due to the fact that the infection is asymptomatic, and symptoms often only develop many years following initial infection (CDC, 2017). Although most HPV infections will clear without medical intervention, individuals who contract persistent high-risk HPV types may eventually develop cancer (CDC, 2017). Cervical cancer is by far the most common HPV-

related cancer, as nearly all cases of cervical cancer can be attributable to HPV infection (CDC, 2017). Cervical cancer is the second most common cancer among women in Nigeria (Ferlay et al., 2014). Cervical cancer morbidity and mortality is high in Nigeria, where an estimated 14,000 women are diagnosed annually with cervical cancer, and an estimated 26 women die every day of cervical cancer (Ogundipe, 2013). The reported age-specific rate of cervical cancer in three states (Ibadan, Abuja, Calabar) were 36.0, 30.3, and 21.0/100,000 among women 15 years of age and above; (Jedy-Agba, et al., 2012; Ekanem, et al., 2016). It is evident that cervical cancer is a disease affecting many women who may still be giving birth, raising children and supporting the family financially.

HPV vaccines is projected to eliminate approximately 70% of cervical cancers and once-in-a-lifetime screening, performed by women in their 30s or 40s could reduce the risk of cervical cancer by 25 to 30% (WHO, 2014). Although the widespread availability and uptake of HPV vaccine and cervical cancer screening has significantly contributed to the declining incidence and mortality of HPV infection and cervical cancer in developed countries (Cuzick, et al., 2008), this is not the case in developing countries. Similar to the situation in many developing countries, the rates of HPV vaccination and cervical cancer screening in Nigeria are not known but presumed to be extremely low (Ndikom & Oboh, 2017; Ogochukwu et al., 2017). Reports from recent investigations indicate fewer than 14% of adolescent girls had received HPV vaccine (Ndikom & Oboh, 2017; Ogochukwu et al., 2017) and less than 10% of women have been cervical cancer screening (Idowu, Olowookere, Fagbemi, & Ogunlaja, 2016; Wright et al., 2014). Of particular note, Awodele and colleagues (2011) also reported poor uptake of cervical screening among nurses, with 60% of the sample of 200 nurses reporting never having been screened for cervical cancer.

Amplifying this low uptake of cervical cancer screening in Nigeria are a wider range of personal, social, political and institutional factors. Commonly reported barriers include lack of awareness, poor knowledge of diseases and preventive measures, lack of spousal support, misperceptions, stigma and modesty, cultural beliefs and practices, cost of screening, access to and use of health facilities (Adetule, 2016; Lim & Ojo, 2017; Ndikom & Ofi, 2012; Ezeonwu, 2014; Modibbo et al., 2016). Furthermore, a woman's risk of contracting HPV infection and subsequently developing cervical cancer depends not only on her own sexual behaviors and practices, but also on those of her male partner(s). The importance of involving men in reproductive health programs has gained increasing appreciation since the mid-1990s, given the recognition of the impact of sociocultural factors on women's reproductive health. Men play significant roles in reproductive health through their sexual behaviors, emotional support, family decisions and control of family resources.

Health education is an effective method of increasing awareness, knowledge, and utilization of HPV vaccination and cervical cancer screening services (Chigbu, Onyebuchi, Onyeka, Odugu, & Dim, 2017; Gana, Oche, Ango, Raji, & Okafoagu, 2016; Mbachu, Dim, & Ezeoke, 2017). Lack of awareness and knowledge and persistent misconceptions about HPV infection and cervical cancer may contribute to lower levels of perceived susceptibility and reduced uptake of the preventive measures (Becker, 1974). Interventions such as community outreach activities, educational fairs, individual mailings, telephone calls and health care provider reports have been designed to improve HPV vaccination and cervical cancer screening in different populations and at various levels (Falk, 2018; Okasako-Schmucker, et al., 2018; Kester, et al., 2014; Krawczyk, et al., 2012). Some

studies have evaluated community-directed cervical cancer screening interventions in Nigeria (Abiodun et al., 2014; Odunyemi, Ndikom, & Oluwatosin, 2018). A community health education nurse-directed 2-day workshop on cervical cancer and HPV vaccination reported very significant increases (mean score 9.6 ± 7.2 to 21.5 ± 6.2 , $p < .05$) in knowledge, and more than 93% of mothers who participated were ready to accept HPV vaccination for their adolescent daughters (Odunyemi, Ndikom, & Oluwatosin, 2018). Another community-based intervention involving adult women in rural communities utilized multiple mediums including structured health education, didactic lectures, a movie and a handbill (pamphlet) to increase awareness of cervical cancer and cervical cancer screening by 83.1% (Abiodun et al., 2014).

The assessment of the effectiveness of different educational strategies is pertinent as many health interventions deemed cost-effective are not affordable in developing countries because of resource limitations (Bilinski, et al., 2017). Adopting low-cost interventions that maximize health returns is essential in low resource settings. Increasing universal coverage for interventions with high potential population health benefits is imperative in public health planning and implementation, especially for low resource settings, and residents in hard to reach areas. Prior research has shown that increasing awareness and knowledge of HPV, HPV vaccination, and cervical cancer, and cervical cancer screening has been effective in increasing both behavioral intention and behavior. Our aim was to implement an educational intervention, using two strategies, one that could be efficiently delivered to groups in natural settings such as churches, and one that could be delivered to individuals who may not be accessible in group settings. Based on the assumption that some members of the target population would be more accessible and/or

amenable to a group interventions and others to an individual intervention, two different intervention strategies that delivered the same content were employed to maximize population reach. To our knowledge, to date no study has evaluated the efficacy of two, low cost interventions for improving HPV vaccination and cervical cancer screening in Nigeria. Therefore, the aim of this research was to evaluate the preliminary efficacy of two different community-based health education intervention strategies, aimed at improving awareness and knowledge of: (1) HPV, HPV vaccination, cervical cancer, and cervical cancer screening, and (2) intention to take and or encourage HPV vaccination and cervical cancer screening among urban adults in Nigeria.

The research site was Anambra, the eighth most populated state in Nigeria. Anambra residents have high literacy rates. The state is a highly-urbanized state with 62% of its population living in urban areas. It is located in the southeastern Nigeria, within an area of 1,870 mi², and a has a total of 5,366,900 (2013 estimate) inhabitants (National Population Commission of Nigeria, 2015). The educational interventions and data collection occurred from December 2017 to January 2018.

Method

This study employed pre-test and post-test design to evaluate the effectiveness of a community-based health education intervention, a face-to-face presentation delivered in group settings and printed pamphlet delivered to individuals. Both intervention strategies involved men and women.

Participants. The study participants were men and women who met the inclusion criteria and volunteered to participate. The inclusion criteria were adults between the age of 18 and 65 years who were able to read and write in English. Participants who received

the face-to-face presentation (Presentation Group), and participants who received a printed pamphlet (Pamphlet Group) were allocated to groups using convenience sampling based upon setting, access, and individual preference. Participants recruited in large groups (e.g. churches, organizations) received face-to-face group-based education while participants recruited in single groups (e.g., large extended families) or alone received printed pamphlet-based education. Participation was voluntary and participants in both groups were given option to choose or reject either of the interventions. Only participants who completed the pre- and post-intervention surveys were included in the final analysis. A sample size of 200 participants were estimated. To account for possible attrition, 281 participants were recruited; 168 participants were recruited for the Presentation Group and 113 participants were recruited for the Pamphlet Group.

To recruit participants, individual contacts were made with priests, lay leaders, and head of organizations, informing them of the study. Churches have been used effectively in health promotion interventions in communities in Nigeria, where faith has a substantial role with 87% of people reporting religious service attendance at least once a week (Ezeanolue, et al., 2015; Ucheaga, & Hartwig, 2010; Abanilla, et al., 2010). At other sites (e.g., hospitals, educational institution), the primary investigator approached individuals, and after verifying they met the inclusion criteria, extended an invitation to participate. A detailed explanation of the objectives, eligibility criteria, confidentiality, and the voluntary nature of study participation was done. All participants completed the paper-based, self-administered pre- and post-surveys. Verbal informed consent was obtained, given that it is more culturally acceptable and appropriate than written consent in Nigeria. Human subject protection approval was received from the University of South Carolina Institutional

Review Board for which the primary investigator was affiliated. All data were collected in a span of four weeks from December 2017 to January 2018.

Intervention. The face-to-face presentation and printed materials were developed from available educational resources on the Center for Disease Control and Prevention (CDC) and the Foundation for Women's Cancer websites (CDC, 2017; Foundation for Women's Cancer, 2017). The educational content and presentation materials were adopted and modified by the primary investigator, a native Nigerian, to be culturally- and environmentally relevant to the target population. Both modalities had the same content which included: information on the HPV, HPV vaccine, cervical cancer and cervical cancer screening, statistical facts on incidence and prevalence of HPV and cervical cancer in Nigeria as well as the rate of HPV vaccination and cervical cancer screening, and common misconceptions about HPV, HPV vaccination, cervical cancer and cervical cancer screening.

The intervention design included three phases. The pre-intervention phase was the administration of baseline information using the questionnaire. The intervention phase involved the administration of the health education intervention, in the form of either a face-to-face health presentation or a printed pamphlet. The total time (including pretest, intervention and posttest) for participants who received face to face presentations ranged between 40 and 60 minutes, whereas study participation time for those who received the pamphlet ranged from 20 to 80 minutes. Among both groups, the post-intervention phase involved re-administration of the questionnaire immediately following the educational intervention.

Survey Instrument. A questionnaire previously developed and used to assess awareness, knowledge, attitude and practice of HPV and cervical cancer preventive measures among 352 men in Nigeria was adopted and modified. Survey questions were based on and/or adapted from other existing surveys, including the Cervical Cancer Free Coalition National Surveys; Health Information National Trends Survey and previous studies on HPV and cervical cancer among men in sub-Saharan Africa (Maree, Wright, & Makua, 2011; Rosser, Zakaras, Hamisi, & Huchko, 2014; Rwamugira, Maree, & Mafutha, 2017; Williams, & Amoateng, 2012). There were two versions of the English-language survey, one for men and the other for women. The men's survey contained 44 questions and the women's survey consisted of 47 questions. The three additional questions for women related to decision making. Each version addressed awareness, knowledge, attitude, intention and stigma. Question format included 4 open-ended questions and 40 and 43 multiple-choice questions for men and women respectively.

Data Analysis Strategies. Data were manually entered into an excel spreadsheet, crosschecked for correctness, and subsequently analyzed using Statistical Analysis System (SAS) software version 9.4. Data analysis consisted of descriptive statistics (mean, frequency and percentage) for socio-demographic variables. Differences between the demographic characteristics of the two groups were evaluated using t-test and Chi square statistics. In regard to knowledge of HPV and cervical cancer, a composite score was computed for each respondent by assigning a score of 1 to each correct answer and 0 to each wrong answer. Their level of knowledge was scored and categorized as follows: 0-4 is low, 5-9 is fair, 10-13 is high. Descriptive statistics were used to describe group frequencies pre-and post-test for each intervention group and changes in pre-post

knowledge changes were assessed independently for each group using ANOVA. The statistical significance was set at $p < 0.05$.

Results

Of the 266 participants who completed both the pre-intervention and post-intervention questionnaire, 163 were in the Presentation Group and 103 were in the Pamphlet Group. Socio-demographic characteristics of the participants are shown in Table 3.1. Significant differences were found between the sociodemographic characteristics of the groups existed in age, sex, educational level and monthly income ($p < 0.05$). The mean age of the Presentation Group and Pamphlet Group was 35.6 ± 9.64 years and 38.8 ± 10.8 years respectively. More than half of the participants were women (54.0% Presentation Group and 61.2% Pamphlet Group) and married (59.5% Presentation Group and 71.6% Pamphlet Group). There were no significant differences in marital status ($p=0.2494$) between the two groups. Overall, participants were well-educated, but fewer Presentation Group participants (71.6%) reported having college education than Pamphlet Group participants (84.3%). Despite high educational levels, 55.8% of Presentation Group participants and 36.0% Pamphlet Group participants reported less than 50,000 Nigerian naira monthly income (equivalent to \$139 in the United States). The analysis of the demographic characteristics showed that the two groups were different, therefore their knowledge and intention to take HPV vaccine and Cervical Cancer screening were analyzed separately.

Data on HPV and HPV vaccine knowledge and are presented in Table 3.2. The groups will be analyzed separately because the participants differ in many of their baseline characteristics. Only participants who took the pre and posttest were included in the

analysis. There are differences in the number of responses per item because participants who had never heard of HPV were told to skip the other HPV knowledge questions.

Table 3.1: Summary of Participant Demographics

Characteristic	Presentation Group n (%)	Pamphlet Group n (%)	t-test
Age, years (mean±SD)	35.6±9.64)	38.8±10.8	0.0168
Age group (years)			
18 -24	5 (3.14)	3 (2.94)	0.0370
25 - 34	71 (44.7)	43 (42.2)	
35 - 44	57 (35.9)	23 (22.6)	
45 - 54	18 (11.3)	23 (22.6)	
55 and above	8 (5.03)	10 (9.80)	
Sex			
Men	75 (46.0)	40 (38.8)	0.0427
Women	88 (54.0)	63 (61.2)	
Marital status			
Single	66 (40.5)	29 (28.4)	0.2494
Married	97 (59.5)	73 (71.6)	
Educational level			
No formal education	0 (0.00)	0 (0.00)	0.0614
Primary education	3 (1.85)	2 (1.94)	
Secondary education	43 (26.5)	14 (13.7)	
Tertiary education	116 (71.6)	86 (84.3)	
Monthly income			
Less than #50, 000	86 (55.8)	36 (36.0)	0.0054
#50-100,000	34 (22.1)	32 (32.0)	
Above #100,000	34 (22.1)	32 (32.0)	

For the Presentation Group, at pre-intervention, 17.8% of respondents had heard of HPV infection, whereas on the post-test, 91.4% reported knowledge of HPV infection, and 23.3% knew that HPV is a sexually transmitted virus, with a statistically significant difference ($p < 0.05$). Also, less than one-fourth of participants reported knowing that men and women can contract HPV infection prior to the intervention, whereas at post-intervention, more than 82% reported knowledge. At baseline, level of awareness of HPV

vaccine was 11.8%, which rose to 88.8% at post intervention, with a statistically significant difference ($p < 0.05$).

About 27.2% of Pamphlet Group respondents had heard of HPV infection at preintervention, whereas on the post-test, 98.1% reported knowledge of HPV infection ($p < 0.05$), as shown in Table 3.2. At baseline, 35.0% knew that HPV is a sexually transmitted virus, while 98.1% participants reporting awareness of HPV at postintervention ($p < 0.05$). Prior to the intervention, 25% of the participants reported knowing that men and women can contract HPV infection, whereas at post-intervention, more than 82% reported knowledge. The level of awareness of HPV vaccine was 20.4% at baseline and increased 85.4% at postintervention ($p < 0.05$).

Table 3.3 presents findings related to participants' knowledge of cervical cancer and cervical cancer screening. Similar to HBV knowledge, the two groups were different at baseline and, therefore, the groups were analyzed separately. The proportion of Presentation Group participants at pre-intervention, who had heard of cervical cancer was 64.2% and rose to 93.8% at post-intervention ($p < 0.05$). About 36.8% reported knowing that smoking and multiple sexual partners increases the risk of getting cervical cancer at baseline, which increased to more than 65% knew post intervention ($p < 0.05$). Only 25.8% of Presentation Group participants knew cervical cancer is associated with HPV infection at baseline, and at post-intervention, more than 85% of participants were aware that cervical cancer is associated with HPV infection with a significant difference of ($p < 0.05$). Additionally, at pre-intervention, among the Presentation Group participants only 13% and 14.9%, respectively had heard of about the pap smear test or VIA, which were statistically significant ($p < 0.05$) at post-intervention.

Table 3.2. Participant Knowledge of HPV and HPV Vaccine Pre- and Post-Intervention

Variables	Presentation Group n (%)			Pamphlet Group n (%)		
	Pre	Post	<i>p</i>	Pre	Post	<i>P</i>
Have you ever heard of HPV?						
No	112(68.7)	8(4.91)		66(64.1)	1(0.97)	
Yes	29(17.8)	149(91.4)	<.0001	28(27.2)	101(98.1)	<.0001
Not sure	22(13.5)	6(3.98)		9 (8.74)	1(0.97)	
How do you think one can get HPV?						
Physical contact					6(5.83)	<.0001
Dirty toilets	6(3.68)	17(10.6)	<.0001	2(1.94)	4(3.88)	0.0034
Poor personal hygiene	12(7.36)	13(7.98)	0.4505	1(0.87)	3(2.91)	0.0678
Sexual intercourse	16(9.60)	18(11.0)	0.4670	2(1.94)	101(98.1)	<.0001
Sexual intercourse	38(23.3)	151(92.6)	<.0001	36(35.0)		
How do you know when someone has HPV?						
Itching						
Pain during urination	18(11.0)	151(92.6)	<.0001	10(9.71)	101(98.1)	<.0001
Genital discharges	10(9.71)	25(15.3)	0.0002	4(3.88)	10(9.71)	0.0152
Genital rash	15(9.20)	37(22.7)	<.0001	14(13.6)	50(48.5)	<.0001
No symptoms	16(9.82)	13(7.98)	0.4180	12(11.7)	19(18.5)	0.0396
No symptoms	10(6.13)	103(63.1)	<.0001	13(12.6)	33(32.0)	<.0001
Who can contract HPV?						
Male only	0(0)	0(0)		9(8.87)	2(1.94)	
Female only	11(6.74)	6(3.82)		9(8.87)	13(12.6)	
Male and female	41(25.2)	151(96.2)	0.0016	26(25.2)	85(82.5)	<.0001
What factors increase the risk of getting HPV?						
Poor diet						
Smoking	6(3.68)	5(3.07)	0.2124	0(0)	2(1.94)	<.0001
Poor personal hygiene	7(4.29)	41(25.2)	<.0001	11(10.7)	48(18.1)	<.0001
Multiple sexual partners	16(9.82)	25(15.4)	0.0024	3(2.91)	5(4.85)	0.0612
Multiple sexual partners	39(23.9)	147(90.7)	<.0001	33(32.0)	92(89.3)	<.0001
Have you heard about HPV vaccine?						
No	133(82.6)	16(9.94)		77(74.8)	9(8.74)	
Yes	19(11.8)	143(88.8)	<.0001	21(20.4)	88(85.4)	<.0001
Not sure	9(5.59)	2(1.24)		5(4.85)	6(5.83)	
Who can take the vaccine?						
Boys and girls	14(8.59)	96(58.9)	<.0001	15(14.6)	64(62.1)	<.0001
Young men and women	23(14.4)	103(63.2)		22(21.4)	66(64.1)	

For participants in Pamphlet Group, the proportion of participants who had heard of cervical cancer was 71.8% at baseline and rose to 92.1% at post-intervention. At pre- 51.3% of the participants reported knowing that smoking and multiple sexual partners increases the risk of getting cervical cancer ($p < 0.05$). however, at post-intervention, 51.5% and 89.3% of the participants knew that cervical cancer is associated with and infection respectively ($p < 0.05$).

Also, 67.0% of the participants knew cervical cancer is associated with HPV infection, and 92.2% became aware at postintervention ($p < 0.05$). Only 37.9% and 31.1% respectively had heard of the pap smear and HPV tests; which increased to almost 70% and were statistically significant ($p < 0.05$). Both community-based educational methods significantly increased participants' knowledge of cervical cancer and cervical cancer screening as shown in Table 3.3.

Participants' Level of Knowledge of HPV and Cervical Cancer. Table 3.4 shows the respondents level of knowledge of HPV and cervical cancer. In the Presentation Group 85.3% had poor knowledge, 9.82% had moderate and 4.91% had high level of knowledge of HPV and HPV vaccine, with significant improvements made at post-intervention.

Participants in the Pamphlet Group also significantly improved their knowledge of HPV and HPV vaccine from pre-test to post-test. Those who had high knowledge of HPV and HPV vaccine increased from 5.88% to 46.6%. In addition, both groups significantly increased knowledge of cervical cancer and cervical cancer screening as shown below in Table 3.4.

Table 3.3 Knowledge of Cervical Cancer and Cervical Cancer screening Pre-intervention (Pre) and Post intervention (Post).

Variables	Presentation Group n (%)			Pamphlet Group n(%)		
	Pre	Post	<i>p</i>	Pre	Post	<i>p</i>
Have you ever heard of cervical cancer?						
No	34(21.0)	3(1.86)		25(24.2)	2(1.98)	
Yes	104(64.2)	151(93.8)	<.0001	74(71.8)	93(92.1)	0.0001
Not sure	24(14.8)	6(5.94)		4(3.88)	6(5.94)	
Which of the following do you think increases the risk of getting cervical cancer?						
Smoking	40(24.5)	60(36.8)	0.0020	26(25.2)	53(51.5)	<.0001
Multiple sexual partners	62(38.0)	136(83.4)	<.0001	71(68.9)	92(89.3)	
Do you think cervical cancer is associated with an infection?						
No	51(34.7)	9(5.73)		32(33.0)	8(7.77)	
Yes	96(65.3)	148(94.3)	<.0001	65(67.0)	95(92.2)	<.0001
If yes; what type of infection is cervical cancer associated with?						
HPV infection	42(25.8)	140(85.9)	<.0001	57(57.0)	92(89.3)	<.0001
Cervical cancer be prevented?						
No	21(14.2)	3(1.92)		11(10.7)	6(5.83)	
Yes	127(85.8)	153(98.1)	0.0201	92(89.3)	97(94.2)	0.0082
Early detection of cervical cancer is helpful?						
No	14(9.21)	6(3.82)	0.0075	6(5.88)	1(1.03)	0.1967
Yes	138(90.8)	151(96.2)		96(94.1)	96(99.0)	
Have you heard about Pap smear test or Visual Inspection with Acetic Acid (VIA)?						
No	113(69.8)	11(6.75)		55(53.4)	21(20.4)	
Yes	21(13.0)	138(84.7)	<.0001	39(37.9)	72(69.9)	<.0001
Not sure	28(17.3)	14(8.59)		9(8.74)	10(9.71)	
Have you heard about HPV test?						
No	119(73.9)	12(7.50)		55(53.4)	9(8.74)	
Yes	24(14.9)	136(85.0)	<.0001	32(31.1)	90(87.4)	<.0001
Not sure	18(11.2)	12(7.50)		16(15.5)	4(3.88)	
Who can take Pap smear test or VIA or HPV test?						
Women	40(24.5)	137(84.1)	<.0001	57(55.9)	92(89.3)	<.0001

Table 3.4: Participants Level of Knowledge of HPV, HPV Vaccine, Cervical Cancer and Cervical Cancer screening Pre and Post intervention.

Variables	Presentation Group n(%)			Pamphlet Group n(%)		
	Pre	Post	<i>p</i>	Pre	Post	<i>p</i>
Level of Knowledge of HPV and HPV Vaccine.						
Poor	139(85.3)	13(7.98)	<.0001	82(80.4)	20(19.4)	<.0001
Moderate	16(9.82)	61(37.4)		14(13.7)	35(34.0)	
High	3(4.91)	89(54.6)		6(5.88)	48(46.6)	
Level of Knowledge of Cervical Cancer and Cervical Cancer screening?						
Poor	64(39.3)	12(7.36)	<.0001	21(20.4)	3(2.91)	0.0002
Moderate	63(38.6)	29(17.8)		23(22.3)	16(15.5)	
High	36(22.1)	122(74.9)		59(57.3)	84(81.6)	

Reported Uptake of HPV Vaccine and Cervical Cancer Screening at Baseline.

Less than 8% of respondents in both groups had received either the HPV vaccine themselves or knew of a family member had taken HPV vaccine. Data regarding baseline uptake of cervical cancer prevention and screening is presented in Table 3.5. As shown, the number of men and women who had received the HBV vaccination were similar and there was little difference between groups ($p > 0.05$). Additionally, very few people in either group, 5.52% in the Presentation Group and 11.6% in the Pamphlet Group, received or had a family member who had received a pap smear or VIA test ($p > 0.05$).

Intention to take and or encourage HPV Vaccine. Table 3.6 presents the study participants' intent to receive and or encourage HPV vaccine before and after the intervention. Participants were asked questions about their willingness to take, encourage and pay for a family member or their uptake of HPV vaccine. Less than 19% of respondents in the Presentation group planned to receive HPV vaccine, and only 26.7% were willing to encourage a family member or friend to receive the HPV vaccine at baseline. At post-

intervention, 69.1% planned to receive HPV vaccine, and 85.3% were willingness to encourage a family member or friend to receive the HPV vaccine ($p < 0.05$ for both pre-versus post-test). In addition, participants indicating an intent to pay to receive or for a family member to get HPV vaccine pre-intervention was 31.3% among Presentation Group participants and increased to 63.4% with a significant difference ($p < 0.05$).

About 18.5% and 45.6% of respondents in the Pamphlet Groups planned to receive HPV vaccine and were willingness to encourage a family member or friend to receive the HPV vaccine, respectively, at baseline. Intentions towards HPV vaccination significantly increased to more than 53% at post-intervention, which was significantly different from baseline in ($p < 0.05$). Similarly, participants intent to pay to receive or for a family member to get HPV vaccine was 40.8% at pre-intervention and rose to more than 73% at post-intervention ($p < 0.05$). As shown in Table 3.6, at post-intervention, we observed an increase in participants' intent to receive, encourage and pay for HPV vaccine in both groups.

Table 3.5: HPV Vaccine and Cervical Cancer Screening Rate

Variables	Presentation Group n(%)	Pamphlet Group n(%)
Have you or anyone in your family had HPV vaccine? If Yes, who?		
Me	4 (2.45)	2 (1.94)
Wife	2 (1.23)	0 (0)
Daughter	0 (0)	2 (1.94)
Son	0 (0)	0 (0)
Others	2 (1.23)	4 (3.88)
Nobody	147 (91.8)	95 (92.23)
Have you or anyone in your family done a pap smear or VIA test? If Yes, who?		
Wife	6 (3.68)	5 (4.85)
Daughter	0 (0.00)	3 (2.91)
Others	3 (1.84)	4 (3.88)
Nobody	149 (91.4)	82 (79.6)

Table 3.6. Intention to encourage and or take HPV Vaccine.

Variables	Presentation Group n(%)			Pamphlet Group n(%)		
	Pre	Post	<i>p</i>	Pre	Post	<i>P</i>
Do you plan to take HPV vaccine?						
No	51(31.3)	20(12.5)	<.0001	47(45.6)	23(22.3)	<.0001
Yes	30(18.4)	112(69.1)		19(18.5)	55(53.4)	
Maybe	82(50.3)	30(18.5)		37(35.9)	25(24.3)	
Will you encourage your family member or friends to take HPV vaccine?						
No	15(9.32)	2(1.23)	<.0001	15(14.6)	12(11.7)	<.0001
Yes	43(26.7)	139(85.3)		47(45.6)	7(73.8)	
Maybe	103(64.0)	22(13.5)		41(39.8)	15(14.6)	
Who will you encourage to take HPV vaccine?						
Wife	11(14.7)	45(43.7)	<.0001	17(10.4)	18(17.5)	0.8185
Daughter	44(27.0)	106(65.0)		49(30.1)	83(80.6)	
Son	36(22.2)	103(63.2)		26(25.2)	74(71.8)	
Others	38(23.3)	72(44.2)		27(26.2)	41(39.8)	
Nobody	80(49.1)	20(12.3)		22(21.4)	8(7.77)	
Will you pay to receive or for a family member to get HPV vaccine, If the vaccine cost too much?						
No	27(16.6)	11(6.79)	<.0001	21(20.4)	7(6.93)	0.0007
Yes	51(31.3)	109(67.3)		42(40.8)	64(63.4)	
Maybe	85(52.1)	42(25.9)		40(38.8)	30(29.7)	

Intention to take and or encourage Pap smear or VIA. Similar to other survey items significant increases were noted in both groups' intention to receive and willingness to encourage a family member to receive a screening post-intervention (Table 3.7). Among the women surveyed in the Presentation Group, 37.5% were planning to receive screening, and the proportion of respondents willing to encourage family member to receive screening at baseline was 44.8%. These intentions increased significantly within the Presentation Group at following the educational intervention ($p < 0.05$). The proportion of participants

willing to pay to receive or to pay for a family member to receive a pap smear was 34.0% at pre-intervention phase, with no significant increase at post-intervention ($p > 0.05$).

For pamphlet group, 33.3% of the women surveyed were planning to receive screening, and 51.5% were willing to encourage family member to receive screening at baseline. However, at post intervention, more than 61% of both participants were planning to receive screening and were willing to encourage family member to receive screening ($p < 0.05$ for both intentions pre- versus post-test). The proportion of participants in the pamphlet group willing to pay to receive or to pay for a family member to receive a pap smear was 46.6% at baseline slightly increased (59.2%) at post-intervention, but the changes was not statistically significant.

Table 3.7. Intention to Encourage and or Take Cervical Cancer Screening.

Variables	Presentation Group n(%)			Pamphlet Group n (%)		
	Pre	Post	<i>p</i>	Pre	Post	<i>P</i>
Do you plan to go for cervical cancer screening (Women only)?						
No	23(26.1)	4(4.55)	<.0001	34(54.0)	15(23.8)	0.0004
Yes	33(37.5)	74(84.1)		21(33.3)	39(61.9)	
Not sure	32(36.4)	10(11.4)		8(12.7)	9(14.3)	
Will you encourage any of your family member to receive pap smear?						
No	15(9.20)	3(1.84)	<.0001	11(10.7)	11(10.7)	<.0001
Yes	73(44.8)	138(84.7)		53(51.5)	81(78.6)	
Not sure	75(46.0)	22(13.5)		39(37.9)	11(10.7)	
Will you pay to receive or for a family member to receive a pap smear; if the test cost too much?						
No	15(9.26)	12(7.36)	<.0001	22(21.4)	19(18.5)	0.0633
Yes	55(34.0)	119(73.0)		48(46.6)	61(59.2)	
Not sure	92(56.8)	32(19.6)		33(32.0)	23(22.3)	

Logistic regression of factors associated with participants' level of knowledge of HPV and cervical cancer. The adjusted model for level of knowledge of HPV and HPV vaccine is presented in Table 3.8. The adjusted model included age group, marital status, education and income. For the Presentation group, the odds of increased knowledge of HPV and HPV vaccine at post intervention for participants between age 18-24 years is 18.1 times higher than the odds of increased knowledge of HPV and HPV vaccine for participants who are 55 years and older, statistical significant difference. Similarly, the odds of high knowledge of HPV and HPV vaccine for men is 1.17 times higher than the odds of high knowledge of HPV and HPV vaccine for women with no statistical significant difference. Also, no significant difference was observed based on the participants' marital status, educational level and monthly income.

For the Participants in the Pamphlet group, the odds of increased knowledge of HPV and HPV vaccine at post intervention for participants between age 45-54 years is 1.45 times higher than the odds of increased knowledge of HPV and HPV vaccine for participants who are 55 years and older, with no statistical significant difference. The odds of increased knowledge of HPV and HPV vaccine were not significantly difference among participants in the Pamphlet group based on the sex, marital status, educational level and monthly.

Results of the regression analyses (Table 3.9) indicated the odds of high knowledge of cervical cancer and cervical cancer screening among participants in various groups. For the Presentation group, the odds of high knowledge of cervical cancer and cervical cancer screening for participants aged 18-24 is 18.1 times and 5.7 times for participants aged 45 to 55 than the odds of high knowledge for those who are 55 years and

above with significant difference. However, the odds of high knowledge of cervical cancer and cervical cancer screening were not significantly different among the participants based on the sex, marital status, educational level and monthly income. Additionally, for the pamphlet group, the odds of high knowledge of cervical cancer and cervical cancer screening were not significant among participants based on the age group, sex, marital status, educational level and monthly income.

Table 3.8: Regression Analysis of Factors Associated with High Knowledge of HPV and HPV Vaccine.

	Presentation Group			Pamphlet Group		
	Odds ratio	95% CI for OR		Odds ratio	95% CI for OR	
		Lower	Upper		Lower	Upper
Age Group						
18 - 24	18.0889	2.4854	131.65	1.4530	0.2893	7.2981
25 - 34	3.7556	0.2555	1.6513	3.8089	0.8097	17.9179
35 - 44	2.8739	0.8300	9.9512	3.0244	0.6380	14.3365
45 - 54	5.7819	1.4558	22.9636	2.2758	0.5400	9.5903
55+ (referent)						
Sex						
Men	1.1667	0.6203	2.1944	1.0025	0.5032	1.9974
Women (referent)						
Marital Status						
Single	0.7746	0.3936	1.5248	0.5160	0.1987	1.3402
Married (referent)						
Education Level						
No formal education		0.06190	0.4488	0.0298	0.1696	0.9854
Primary education	0.2146	0.4143	1.4568	2.3555	0.6679	8.3076
Secondary education	0.7769			1.7533	0.7635	4.0261
Tertiary education (referent)						
Monthly income (Nigerian Naira)						
Less ₦50,000 (referent)		0.3634	1.8853			
₦50-100,000	0.8277	0.9340	5.0581	0.3768	0.1594	0.8906
Above ₦100,000	2.1735			2.1404	0.9397	4.8752

Table 3.9: Regression Analysis of Factors associated with High Knowledge of Cervical Cancer and Cervical Cancer Screening.

	Presentation Group			Pamphlet Group		
	Odds Ratio	95% CI for OR		Odds ratio	95% CI for OR	
		Lower	Upper		Lower	Upper
Age group						
18 - 24	1.2511	0.2668	5.8680	0.4377	0.1045	1.8335
25 - 34	1.6448	0.4682	5.7784	4.1428	1.2717	13.4960
35 - 44	2.4658	0.8182	7.4318	1.6761	0.4377	6.4176
45 - 54	5.2721	1.4257	19.4956	1.7647	0.5947	5.2369
55+ (referent)						
Sex						
Men	0.3842	0.2118	0.6971	0.5259	0.2507	1.1033
Women (referent)						
Marital status						
Single	1.0247	0.5073	2.0699	0.3154	0.1255	0.7930
Married (referent)						
Education Level						
No formal education				0.2387	0.06620	0.8607
Primary education	0.8375	0.3487	2.0116	0.01479	0.005176	0.04227
Secondary education	0.3418	0.1812	0.6449	0.6495	0.3468	1.2161
Tertiary education (referent)						
Monthly income (Nigerian Naira)						
< ₦50,000 (referent)				0.9121	0.3537	
₦50-100,000	1.2653	0.6081	2.6330	1.4486	0.5181	2.3521
Above ₦100,00	2.3073	0.9897	5.3789			4.0503

Discussion

Given that it is important to increase knowledge of HPV and cervical cancer and engage as many individuals as possible in healthy behavior, offering differing learning modalities is very vital to increase the reach of educational interventions in an effort to improve the overall health of a population. To our knowledge, this is the first study to assess the effectiveness of a community-based intervention that used two educational intervention strategies to improve awareness and knowledge of HPV, cervical cancer and

the preventive measures and their intention to engage in and encourage HPV vaccine and cervical cancer screening in Nigeria. Even though, other studies had utilized various interventions, presumed to be low cost, they delivered more than one low-cost intervention per participant, included only women, and/or did not recruit participants from various locations. The majority of the studies were clinic-based, not community-based. (Odunyemi, Ndikom, & Oluwatosin, 2018; Ndikom, Ofi, Omokhodion, & Adedokun, 2017). One of the studies that utilized a community-based approach, focused on only rural women, and assessed only cervical cancer (Abiodun, Olu-Abiodun, Sotunsa, & Oluwole, 2014). The recruitment of participants from various locations in this study, increased the opportunity to reach individuals who are not associated with groups, such as churches.

Our findings indicate that targeted educational intervention strategies may contribute to increasing knowledge and intended practices related to HPV vaccination and cervical cancer screening. The findings are of particular significance considering the high incidence and prevalence of HPV infection and cervical cancer morbidity and mortality in Nigeria. Given that increased HPV vaccination coverage to a level of about 70% of the population can substantially reduce the prevalence of HPV infections, cervical abnormalities and invasive cervical cancer (WHO, 2009); increasing HPV immunization awareness, knowledge, and intention are critical. Furthermore, a once-in-a-lifetime screening of women in between 30 and 50 years of age could reduce the risk of cervical cancer by 25 to 30% (WHO, 2014).

In this research, both educational modalities (face-to-face group presentation and educational pamphlets) were effective with in Nigerian adults' HPV awareness, knowledge and behavioral intent. At baseline, most participants had very low knowledge levels related

to HPV infection, cervical cancer, and related preventive measures. Prior research in Nigeria has indicated low levels of knowledge of HPV and cervical cancer (Jamda, et al., 2018; Abiodun et al., 2014). In a community-based cervical cancer education initiative among market women in an urban area of Lagos, Nigeria, Wright, Kuyinu, and Faduyile (2010) reported that at pre-intervention, over 75% of participants had no knowledge of cervical cancer pre-intervention. Similarly, Adamu and Colleagues (2012) reported that the vast majority of the female teachers in Birnin-Kebbi, North-Western Nigeria, who participated in their study had very low knowledge of cervical cancer at baseline.

Findings from the present study indicated a marked improvement in the proportion of correct answers to specific questions about the HPV and cervical cancer risk factors, mode of transmission, symptoms, and methods of prevention and about HPV vaccine and cervical screening among the participants in both groups after the educational intervention. More than 82% of the participants in both group correctly answered most questions. It is important to note that both groups received the same information, but in different formats (i.e., group presentation or written information). The significant increase in level of HPV knowledge was similar to other studies carried out in Nigeria (Wright, Kuyinu, & Faduyile, 2010; Ndikom, Ofi, Omokhodion, & Adedokun, 2017) and other developing countries (Chang et al., 2013). For example, Adamu, Abiola, and Ibrahim (2012) noted an improvement of 124.3% in the mean knowledge of cancer of the cervix score among female teachers exposed to an educational intervention in North-Western Nigeria (Adamu, Abiola, & Ibrahim, 2012).

Overall, the level of knowledge of participants in both groups improved. In the Presentation Group, the percentage with poor initial knowledge (85.3%) of HPV and HPV

Vaccine was reduced to 7.98% and among the Pamphlet Group, there was a similar reduction in poor initial knowledge from 80.4% to 19.4%. A statistically significant increase in those with very good knowledge were observed from a very low 4.91% to 54.6% and 5.88% to 46.6% in the Presentation and Pamphlet Groups respectively. Likewise, for cervical cancer and cervical cancer screening, the proportion of participants with good knowledge rose from 22.1% to 74.9% in the Presentation Group from 57.3% to 81.6% in the Pamphlet Group B, while those with poor knowledge reduced from 39.3% to 7.36% and 20.4% to 2.91% in the respective groups. This finding is higher than those reported by Ndikom and colleagues that indicated at baseline 55% of nurses who participated in the educational intervention had poor knowledge, 30% had fair knowledge, and only 15% had high level of knowledge, whereas at post-intervention 26.8% had poor knowledge, 48.3% had fair knowledge and 33.3% had high knowledge (Ndikom, Ofi, Omokhodion, Bakare, & Adetayo, 2017). However, in their research on Nigerian market women, Gana and colleagues (2016) reported that initially less than 10% were aware of the pap smear but that 34% reported increased awareness following the intervention.

The low levels of awareness and knowledge observed at baseline in this research may have contributed to reported low uptake of HPV vaccine and cervical cancer screening among family members. Less than 8% of participants reported having received the HPV vaccine and only 12% reported having a family member who had a pap smear. These findings are consistent with the research conducted by Mbamara and colleagues that found over 85% of the women attending gynecology clinics in a tertiary medical center in South-eastern Nigeria had never received cervical screening, despite having attended the gynecology clinics (Mbamara et al., 2011). Various studies had recorded much lower rates

of vaccine and screening in different parts of the country. In Abuja, Nigeria, only 1.4% of mothers reported having a daughter who had received HPV vaccination (Odunyemi, Ndikom, & Oluwatosin, 2018). Similarly, very low rates (i.e., less than 11%) of cervical screening service utilization were reported among female health workers in Sokoto (Oche, Kaoje, Gana, & Ango, 2013), and civil servants in Plateau (Hyacinth, Adekeye, Ibeh, & Osoba, 2012).

It is important to note that the vast majority of research aimed at assessing the uptake of HPV vaccination in Nigeria focuses only on girls, despite the fact that the HPV vaccine is recommended for both boys and girls. Our findings indicated less than 2% of the respondents reported having a daughter who had been vaccinated and none reported having a son who had received the vaccine. Odunyemi and colleagues (2018) reported that 85.5% of the mothers they surveyed reported lack of information was a deterrent to having their daughters take the vaccine. The fact that HPV vaccine frequently is referred to as a “cervical cancer vaccine” may contribute to limited awareness that the vaccine is also appropriate for boys. Of note, Jones and colleagues (2016) reported that half of the college male students were unaware that the HPV vaccine could be given to males. Also, of note, most published articles in Nigeria tend to address HPV as a virus that causes cervical cancer, rather than an infection in and of its own right, thus making it seem is only a concern for women (Odunyemi, Ndikom, & Oluwatosin, 2018; Wright, Kuyinu, & Faduyile, 2010; Wright, Aiyedehin, Akinyinka, & Ilozumba, 2014).

We also found support for our second objective, which was intention to take and or encourage HPV vaccine and cervical cancer screening. These findings indicated significant improvement in reported intent to take and/or encourage HPV vaccination and cervical

cancer screening among individuals in both groups. Whereas less than 46% of the respondents were willing to take and or encourage their family member to receive HPV vaccine and cervical cancer screening at baseline, approximately 73% of participants were willing to do so post-intervention. These rates are lower than those reported in a study among antenatal women in Ibadan Nigeria (Ndikom, Ofi, Omokhodion, & Adedokun, 2017), where at baseline, not less than 70% of their participants reported a willingness to utilize cervical cancer screening services, more than 85% were willing to utilize the services post-intervention. Similarly, Odunyemi and colleagues (2018) reported that 73.9% of the mothers who participated in a 2-day workshop were ready to accept HPV vaccination for their adolescent daughters at baseline, whereas 93.8% were willing to do so 3 months post-intervention. Among urban residential women in southeast Nigeria, the majority of participants were reported to be willing to be screened both before and after the intervention (Mbachu, Dim, & Ezeoke, 2017). The high rate of acceptance of and willingness to participate in HPV vaccination observed in that study may be attributed to the predominant acceptance of routine childhood vaccinations among Nigerian men and women.

Exploratory subgroup analyses suggested that younger participants aged (18-24) were more likely to know about HPV and HPV vaccine. This may be attributed to their younger age and possible prior personal exposure to HPV vaccination. Of note, there were no differences associated with marital status, levels of education, or monthly income. In contrast, Mbachu and colleagues (2017) reported no significant associations between difference in screening practices and respondents' age but did find statistical significant difference with marital status and levels of education. Married women were more likely to have been screened at least once for cervical cancer than unmarried women as 81.6% of

the 49 respondents who screened for cervical cancer were married. Further, only those who had tertiary education had ever screened for cervical cancer (100%). Of note, the odds of having high knowledge were significant within groups based on their age group, marital status and level of education. Participants who were single in both groups were more likely than married participants, and those with tertiary education were more likely than the rest of the groups to have high knowledge of cervical cancer and cervical cancer screening. Similar to findings in another study that reported that the odds of screening for cervical cancer was 5.8 times more in women who had never been married and 3.3 times in married women (Mbachu, Dim, & Ezeoke, 2017).

Limitations

While the results of this study are very promising, there are some notable limitations. The study was conducted in urban setting, included only participants who can read and write in English, and most were college graduates. Further research is needed to validate the effectiveness of the educational intervention with a different population, setting, and with different socio-economic backgrounds. The use of a pre-post study design and relatively small sample size make it necessary for further research on larger sample using a rigorous research design. The use of immediate pre and posttest method limits the generalization of the result as the result reflects only short-term cognitive responses. Also, the participants were not followed up to ascertain their uptake of the preventive measures and considering that some studies reported poor uptake even with increase awareness, knowledge and willingness; it will be pertinent to investigate means to encourage uptake when other factors are positive. The changes overtime were not evaluated, hence the need for a longitudinal study. Further research should have multiple contacts with participants

and allow time for recollection of information and observe for uptake of the preventive measures.

Another limitation is that while the content in both educational interventions was the same, emphasizing certain aspects of the content was more easily accomplished in the Presentation modality. For example, post-intervention knowledge of HPV infections being asymptomatic appears notably more improved in the Presentation Group. That difference might be attributed to the fact that the asymptomatic characteristic of HPV was repeatedly emphasized in during the presentation whereas it is stated only once in the pamphlet. Thus, the intervention strategies that were implemented could likely be further improved upon and tailored to more effectively deliver the health promotion messages.

Conclusion

These findings of this study, which measured outcomes of a community-based health education intervention using two educational strategies designed to increase knowledge and behavioral intent related to HPV vaccination and cervical screening, provides baseline evidence that low-cost interventions may increase awareness and knowledge. It is inevitably value-laden that credible evidence is required to reduce the gap between the health needs and resources available to respond to them. These findings indicate that targeted health education (face-to-face presentation and printed pamphlet) are effective approach for improving HPV, cervical cancer and preventive measure awareness and knowledge, as well as improving intent to participate in HPV vaccination and screening services. To be effective, HPV health education programs should incorporate the knowledge, needs, interests, culture, values and beliefs of the target population and address issues across all levels of prevention. This study was unique in offering both detailed HPV

infection, cervical cancer and the preventive measures information to men and women living in urban settings. Earlier intervention studies in Nigeria have focused only on women, cervical cancer and screening, but this is the first to include men and combine HPV, cervical cancer and the preventive measures. We found that a large majority of men and women are willing to take and or encourage HPV vaccination and cervical cancer screening to their family and friends, if adequate information is provided to them, consistent with the literatures cited earlier.

Considering the low research funding in developing nations, and the need to assess people living in hard to reach areas, the evidence has implications for public health planning and implementation. Relative to use of multiple educational strategies our finding suggests that educational interventions, delivered via print material or face-to-face group presentations may be low cost approaches that could be used by non-government and government programs in low resource settings. Importantly, study results suggest that group and individual educational strategies that deliver the same content may be effectively used to reach sub-sets of the population.

Additionally, school-based vaccination may be another way to increase HPV vaccination. The sexual nature of HPV infection and the psychosocial factors related to STI, which may have profound effect on uptake vaccine and screening should be considered when planning interventions to improve uptake. Finally, the inclusion and participation of men in the study promotes the recommendation to mobilize and educate men as partners rather than barriers in women's health. Evidence-informed approaches of including and working with men are needed to challenge several barriers influencing HPV vaccination and screening uptake, since men play huge roles in sexual and reproductive

health in SSA countries. Overall, the study findings lay the groundwork for further interventions to promote involvement of men in the reduction of HPV and cervical cancer in Nigeria.

Recommendations

Our findings indicate that increasing public understanding of the virus, its relationship with cervical cancer and the associated preventive measures are important steps to improve uptake. The study improved awareness, knowledge, as well as intent to take and/or encourage HPV vaccination and cervical cancer screening services. Replicating the study to see if increased knowledge and intention will translate into actual uptake of HPV vaccination and cervical cancer Screening. Due to our limited sample size, widespread implementation of at least two educational strategies among different geographic regions ethnic and religious populations across Nigeria would shed light on the long-lasting impact of HPV and cervical cancer education. Future research should compare HPV, cervical cancer and their preventive measures awareness, knowledge and intention across sexes in Nigeria in order to identify if there are significant differences in awareness, knowledge and intention. Additional investigations should be conducted among men or community male leaders only to see if it will mitigate most of the negative psychosocial barriers in Sub Sahara Africa. There is need for future longitudinal research to evaluate the effect of various interventions on increasing HPV vaccination and cervical cancer screening in Nigeria. Though this study was guided by two theories, future research is needed to use theory to inform the development of interventions. Lastly, it is important to develop evaluation and feedback tools to assess the effectiveness of the programs and to

be able to continuously improve the effectiveness of HPV vaccination and cervical cancer screening interventions and programs.

CHAPTER 4
ADDRESSING STIGMA AND IMPROVING HPV AND CERVICAL CANCER
KNOWLEDGE IN NIGERIA: ASSESSMENT OF A COMMUNITY-BASED
EDUCATIONAL INTERVENTION

Introduction

Human papillomavirus (HPV) is the most common viral infection of the reproductive tract, and a highly prevalent group of viruses among sexually active men and women worldwide (World Health Organization [WHO], 2018). HPV is mainly transmitted through sexual contact, but skin-to-skin genital contact is a well-established mode of transmission (WHO, 2018). The prevalence of HPV among the general population is unknown in Nigeria, but there are reports of a seroprevalence rate of 43% among women in the northern state of Birnin-Kebbi (Aminu et al., 2014). Others have reported HPV-IgG antibodies in over a quarter of the general population in Southern Nigeria (Bruni et al., 2014; Okolo et al., 2010). Of note, Aminu and colleagues (2014) reported that the HPV infection was not significantly associated with women's sexual behavior and found similar seroprevalence rates among women in both monogamous and polygamous marriages (Aminu et al., 2014). Furthermore, a link has been established between the HPV status of men and the risk of cervical cancer in their sexual partners (Bosch et al., 2002; Castellsagué et al., 2003). HPV is estimated to cause about 5% of human cancers (de Martel et al., 2012; Bosch et al, 2013); and found to be associated with the development of anogenital cancers (cervical, vaginal, vulvar, penile, and anal), oropharyngeal cancer, and genital warts (CDC, 2017).

Nigeria has one of the most extensive epidemics of cervical cancer in sub-Saharan Africa (Ferlay et al., 2014; Oguntayo et al., 2011), with a high incidence and mortality rates. Cervical cancer is the second most common female cancer in many parts of Nigeria (Oguntayo et al., 2011), and results in annual death of approximately 14,000 women (Ogundipe, 2013). Thus, on average, every hour one Nigerian woman dies of cervical

cancer (Ogundipe, 2013). The vast majority of cervical cancer cases are attributable to HPV infection, which are preventable. A comprehensive approach that includes prevention (i.e., HPV vaccination), effective screening (i.e., Pap smear, Visual Inspection with Acetic Acid [VIA] and HPV tests), early diagnosis, and treatment can significantly reduce the risks of HPV infection and cervical cancer. However, in Nigeria the uptake of these preventive approaches is low (Idowu, Olowookere, Fagbemi, & Ogunlaja, 2016; Wright et al., 2014). Among the majority of the Nigerian population there are low levels of HPV infection and cervical cancer knowledge (Ezenwa, Balogun, & Okafor, 2013; Ndikom & Ofi, 2012). Other barriers to cervical cancer screening include lack of knowledge of the disease and screening techniques, stigma and modesty, and lack of spousal support (Lim & Ojo, 2017).

This study was guided by the Theory of Gender and Power, which explores the depths of sexual inequity, gender and power imbalance (Connell, 1987). This theory further emphasizes social mechanisms that play an active role in maintaining in gender disparities and inequities in women's lives. These inequalities and barriers can be economic, physical, social or personal in nature and operate at the interpersonal and individual levels. Each social structure constitutes different risk factors and exposures that increase Nigerian women's vulnerability to HPV infection and cervical cancer. Spousal support in form of male involvement is important in addressing these exposures and risk factors (Wingood & DiClemente, 2000). Wingood and DiClemente (2000) applied Connell's Theory of Gender and Power in their examination of HIV-related exposures, risk factors, and interventions, noting how gender-based inequities contribute to the generation of risk factors that adversely affect women's health. Among these are gender discrimination, exclusion, labeling and stereotypes, which contribute to social stigma (Link & Phelan, 2001;

Trammell & Morris, 2012). The link between HPV, a sexually transmitted virus, and cervical cancer could contribute to stigmatization of cervical cancer and possibly to reluctance to receive HPV vaccine and cervical cancer screening. In their research with Chinese women in Hong Kong, Lee and colleagues (2007) noted that it was a difficult for their participants to accept the possibility that any sexual behavior could lead to HPV infection and subsequently to cervical cancer. Among women who tested positive for HPV during cervical screening, McCaffery and colleagues (2006) observed feelings of stigma and shame only when the women were aware that HPV is transmitted through sexual contact.

The stigma associated with sexually transmitted infections (STI) may create barriers to information seeking, screening, and treatment (Fortenberry, 2004; Lim & Ojo, 2017). Of note, a higher level of knowledge has been associated with less expressed stigma, especially in sexually transmitted infections like HIV (Exner et al., 2009). Furthermore, support from spouses or male community members can be a key motivation for increasing HPV vaccination and cervical cancer screening especially in male-dominated societies (Kim et al., 2012; Lim & Ojo, 2017; Lyimo & Beran, 2012). Despite men's key role in reproductive and sexual health, HPV and cervical cancer programs in Nigeria have focused only on women, and to date, no research has examined the stigma-associated with HPV and cervical cancer. Interventions involving men and addressing stigma are urgently needed to improve awareness, spousal support, and reduce HPV and cervical cancer stigma in Nigeria. Therefore, one of the aims of this study was to examine the effectiveness of an educational intervention in improving knowledge of, and reducing stigma associated with, HPV and cervical cancer. A further aim was to identify and compare the differences

between men and women in Nigeria. The study was conducted in Anambra State. Anambra State the second most densely populated state in Nigeria, with an estimated 2013 population of 5,366,900 (National Population Commission of Nigeria, 2015). A highly-urbanized state, 62% of the population of Anambra is urban and literacy levels are high.

Method

The research aim was to evaluate the impact of an educational intervention on knowledge and stigma among a sample of urban-dwelling Nigerian men and women. The University of South Carolina Institutional Review Board reviewed and approved the research protocols on 12/4/2017. Inclusion criteria were men and women aged 18 to 65 years who were able to read and write in English. Data collection spanned for four weeks from December 2017 and January 2018. The primary investigator personally recruited participants from 12 urban locations in Anambra, Nigeria (e.g., churches, businesses, healthcare institutions) and verbally explained the study purpose, eligibility criteria, confidentiality, and the voluntary nature of study participation to all potential participants. Participants recruited from churches and other organizations received information about the study from the priests, lay leaders, and organizational leaders. Nigeria is a country where faith has a substantial role with 87% of people reporting religious service attendance at least once a week, churches have been used effectively in health promotion interventions (Ezeanolue, et al., 2015; Ucheaga, & Hartwig, 2010; Abanilla, et al., 2010).

Prior research has shown that increasing awareness and knowledge of HPV, HPV vaccination, and cervical cancer, and cervical cancer screening has been effective in increasing both behavioral intention and behavior, our aim was to implement an educational intervention that could be efficiently delivered to groups in natural settings

such as churches or delivered to individuals who may not be accessible in group settings. Based on the assumption that some members of the target population would be more accessible and/or amenable to a group intervention and others to an individual intervention, two different strategies for delivering the same health education content were employed to maximize population reach. Participants were given the opportunity to choose between attending an oral presentation or receiving printed materials.

A total of 281 participants who met the inclusion criteria were enrolled to receive the intervention and almost 95% (n=266) completed the pretest, intervention and the post-test. Only participants who completed the pre- and post-intervention surveys were included in the final analysis. The timing of the group presentations was coordinated with, and approved by, the officials at each site. Consistent with cultural norms in Nigeria, prior to data collection, the researcher obtained verbal informed consent, rather than written consent from all participants. Each study participant completed the self-administered paper questionnaire supplied by the researcher. The survey instrument used had been previously developed to assess the knowledge, attitude and practice of HPV and cervical cancer preventive measures among Nigerian men (Nkwonta and Messias, 2018) and was culturally modified to address gender issues within the context of Nigerian culture. The original instrument was based on items from Cervical Cancer Free Coalition National Surveys, Health Information National Trends Survey and previous studies on HPV and cervical cancer among men in Ghana, Kenya and South Africa (Maree, Wright, & Makua, 2011; Rosser, Zakaras, Hamisi, & Huchko, 2014; Rwamugira, Maree, & Mafutha, 2017; Williams, & Amoateng, 2012).

Intervention strategies. The community-based intervention was delivered as either a face-to-face health education presentation or a printed pamphlet, both containing identical information on HPV infection, cervical cancer, HPV vaccine and cervical cancer screenings. We developed the intervention content from the educational materials available on the Center for Disease Control and Foundation for Women's Cancer websites (CDC, 2017; Foundation for Women's Cancer, 2017). We adopted and modified the presentation of the materials to make them more culturally and environmentally appropriate for the urban Nigerian population. Pre-intervention, all participants completed the demographic information section and the self-administered questionnaire consisting of multiple-choice, open and close-ended items. Subsequently participants either read the educational pamphlet or listened to an oral presentation by the investigator, followed by completion of the post-assessment survey.

The educational content covered the following topics: (a) pictorial and introductory information on the HPV, including statistical facts of HPV incidence in Nigeria, (b) pictorial and introductory information on the cervix and cervical cancer, including statistical facts of cervical cancer incidence in Nigeria, (c) introduction of the HPV vaccination as a protective and preventive method for HPV infection and cervical cancer, (d) introduction of the cervical cancer screening as a preventive and early detection method for cervical cancer, (e) information on common misconceptions, (f) availability of HPV vaccination and cervical cancer screening in local pharmacies and hospitals, and (g) cost of vaccines and screenings. At post-test, all participants completed the same instrument. All sessions were personally conducted by the primary investigator.

Measures and Analysis. The primary outcomes of interest were knowledge of HPV, HPV vaccine, cervical cancer and cervical cancer screening, and stigma-associated with HPV and cervical cancer. We also collected sociodemographic information (i.e., age, marital status, education, and monthly income). Survey data were entered manually into two excel sheets and cross-checked for correctness. Statistical analysis was conducted using Statistical Analysis System (SAS) software version 9.4. Descriptive analysis (mean, frequency and percentage) were used to calculate the socio-demographics and compare the knowledge and stigma variables at pre-test and post-test. To assess for their level of knowledge, a composite score was computed for each respondent by assigning a score of 0 to each wrong answer and 1 to each correct answer. Knowledge level was categorized as follows: low, 0-4; fair, 5-9; high, 10-13. T-tests were used to assess for significant differences in knowledge and stigma for both groups at pre-test and post-test. Logistic regression analysis was used to calculate the factors associated with knowledge and stigma associated with HPV and cervical cancer. Statistical significance was set at a p-value of <0.05.

Results

Only participants who took the pre- and post-test were included in the analysis. Of the 266 participants, 114 were men and 147 were women. There are differences in number of responses by topic because participants who have never heard of HPV and or cervical cancer were told to skip other HPV and cervical cancer knowledge questions. The sample of participants (Table 4.1) included nearly equal proportions of men and women with a mean age of 37.8 ± 11.1 for men and 36.1 ± 9.43 for women. The dominant age groups were individuals between 24-34 and 35-44 years. The majority of the participants were

married and had tertiary education. There were no statistically significant differences between men and women in regard to participants' age, age group, marital status or educational level. The participants' monthly income differed significantly by gender, with more than half the women (56.9%) earning less than 50, 000 Nigerian Naira every month.

Table 4.1: Summary of participants' characteristics

Characteristic	Men n(%)	Women n(%)	T test
Age, years (mean±SD)	37.8 ±11.1	36.1 ±9.43	0.2032
Age group (years)			
18 -24	4 (3.51)	4 (2.72)	
25 - 34	47 (41.2)	67 (45.6)	0.3065
35 - 44	34 (29.8)	46 (31.3)	
45 - 54	18 (15.8)	23 (15.7)	
55 and above	11 (9.65)	7 (4.76)	
Marital status			
Single	46 (40.4)	49 (32.5)	0.1887
Married	68 (59.7)	102 (67.5)	
Educational level			
No formal education	1 (0.88)		
Primary education	3 (2.63)	1 (0.67)	0.5222
Secondary education	23 (20.2)	34 (22.7)	
Tertiary education	87 (76.3)	115 (76.7)	
Monthly income			
Less than #50, 000	39 (36.1)	83 (56.9)	0.0005
#50-100,000	31 (28.7)	35 (24.0)	
Above #100,000	38 (35.2)	28 (19.2)	

Awareness and Knowledge of HPV, Cervical Cancer and the Screening Measures. Table 4.2 presents data related to participant awareness and knowledge of HPV and cervical cancer. At baseline, the majority of the men (62.6%) and women (70.2%) had never heard of HPV; which was reduced to less than 4% at post-intervention; there was no statistical difference between the two groups ($p=0.2659$). Similarly, at baseline few participants (30.2% of men and 25.8% of women) knew that HPV is sexually transmitted, but at post-intervention, the clear majority of men (95%) and women (94%) had attained

this knowledge ($p < 0.05$). In terms of knowledge regarding susceptibility to contracting HPV, there was a significant difference observed between baseline ($p > 0.05$) and post intervention ($p < 0.05$) responses. Pre-intervention awareness of HPV vaccine was very low and differed between the two groups ($p = 0.0055$), with 72.6% of men and 84.8% of women not aware of HPV vaccine. Post-intervention, lack of awareness was less than 10% in both groups. Furthermore, knowledge of the appropriate age group for HPV vaccine went from less than 14% at pre-test to 60% at post-intervention in both groups, with no statistically significant difference between groups (0.9653).

Table 4.3 presents the data related to pre- and post-intervention cervical cancer awareness and knowledge. There were significant increases in all the measures of cervical cancer awareness and knowledge. In contrast to the awareness and knowledge of HPV and HPV vaccine, a majority of the participants were aware of cervical cancer. At baseline, more than 72% and 62% of men and women were aware of cervical cancer, but less than 58% knew that having multiple sexual partners increase the risk of getting cervical cancer. At baseline there were statistically significant differences in level of awareness of the risk factors for cervical cancer (0.0043), awareness of cervical cancer being caused by an infection (0.0073), and awareness of HPV infection as the major cause of cervical cancer (0.0005) but no statistical differences at post intervention ($p > 0.05$ for all). Although the majority of the participants were aware of cervical cancer at baseline, very few (20.2% of men and 24.5% of women) were aware of any type of cervical cancer screenings. After the targeted educational intervention, awareness of cervical cancer screening increased to 76.5% in men and 80.8% in women (0.0245).

Table 4.2: Participants Knowledge of HPV and HPV Vaccine

Variables	Pre-Intervention n(%)			Post-Intervention n(%)		
	Men	Women	<i>p</i>	Men	Women	<i>P</i>
Have you ever heard of HPV?						
No	72(62.6)	106(70.2)	0.5255	4(3.38)	5(3.31)	0.2659
Yes	31(27.0)	26(17.2)		110(95.7)	140(92.7)	
Not sure	12(10.4)	19(12.6)		1(0.87)	6(3.97)	
How do you think one can get HPV?						
Physical contact	7(6.09)	1(0.66)	0.0217	14(12.4)	9(5.96)	0.0809
Dirty toilets	7(6.09)	7(4.64)	0.6075	2(1.74)	15(9.93)	0.0030
Poor personalhygiene	8(6.96)	12(7.95)	0.7607	8(6.96)	13(8.61)	0.6175
Sexual intercourse	35(30.2)	39(25.8)	0.4114	110(95.7)	142(94.0)	0.5535
How do you know when someone has HPV?						
Itching	20(17.4)	8(5.30)	0.0028	12(10.4)	23(15.2)	0.2430
Pain during urination	7(6.09)	6(3.97)	0.4429	13(11.3)	17(11.3)	0.9907
Genital discharges	13(11.3)	16(10.6)	0.8556	31(27.0)	56(37.1)	0.0783
Genital rash	20(17.4)	8(5.30)	0.0028	16(13.9)	16(10.6)	0.4195
No symptoms	10(8.70)	13(8.61)	0.9803	65(56.5)	71(47.0)	0.1253
Who can contract HPV?						
Male only	9(9.38)	0	0.0056	2(1.80)	0	0.0233
Female only	11(11.5)	9(9.38)		12(10.8)	7(4.79)	
Male and female	32(33.3)	35(36.5)		97(87.4)	139(95.2)	
What factors increase the risk of getting HPV?						
Poor diet	6(5.22)	0(0)	0.0137	2(1.74)	5(3.31)	0.4103
Smoking	4(3.48)	14(9.27)	0.0487	37(32.2)	52(34.4)	0.6991
Poor personalhygiene	12(10.4)	7(4.64)	0.0840	14(12.3)	16(10.6)	0.6726
Many sexual partners	32(27.8)	40(26.5)	0.8094	102(89.5)	137(90.7)	0.7371
Tick the disease you think HPV can cause?						
Cancer of Anus	7(6.09)	7(4.64)	0.6075	65(56.5)	69(45.7)	0.0807
Cancer of cervix	27(23.5)	33(21.9)	0.7555	89(77.39)	124(82.1)	0.3467
Genital warts	14(12.1)	10(6.62)	0.1324	30(26.6)	39(25.8)	0.8957
Cancer of Penis	4(3.51)	9(5.96)	0.3456	69(60.5)	72(47.7)	0.0377
Cancerofmouth/throat	9(7.83)	11(7.28)	0.8695	56(48.7)	66(43.7)	0.4212
Cancer of Vagina	12(10.4)	12(7.95)	0.4922	63(54.8)	91(60.5)	0.3728
Have you heard about HPV vaccine?						
No	82(72.6)	128(84.8)	0.0055	12(10.4)	13(8.72)	0.8879
Yes	20(17.7)	20(13.3)		98(85.2)	133(89.3)	
Not sure	11(9.73)	3(1.99)		5(4.35)	3(2.01)	
Who can take the vaccine?						
Boys & girls	8(6.96)	21(13.9)	0.0611	69(60.0)	91(60.3)	0.9653
Young men & women	19(17.0)	26(17.2)	0.9570	77(67.0)	92(60.9)	0.3110

Table 4.3. Knowledge of Cervical Cancer and Cervical Cancer Screening

Variables	Pre-Intervention n(%)			Post-Intervention n(%)		
	Men	Women	<i>p</i>	Men	Women	<i>P</i>
Have you ever heard of cervical cancer?						
No	24(21.1)	35(23.2)	0.4076	3(2.65)	2(1.34)	0.2374
Yes	83(72.8)	95(62.9)		106(93.8)	138(92.6)	
Not sure	7(6.14)	21(13.9)		4(3.54)	9(6.04)	
Which of the following do you think increases the risk of getting cervical cancer?						
Smoking	26(22.6)	40(26.5)	0.4665	42(36.5)	71(47.0)	0.0854
Multiple sexual partners	46(40.0)	87(57.6)	0.0043	94(81.7)	134(88.7)	0.1166
Do you think cervical cancer is associated with an infection?						
No	4(43.7)	38(27.0)	0.0073	7(6.36)	10(6.67)	0.9223
Yes	58(56.3)	103(73.0)		103(93.6)	140(93.3)	
If yes; what type of infection is cervical cancer associated with?						
HPV infection	30(26.1)	69(46.6)	0.0005	96(83.5)	136(90.)	0.2614
Cervical cancer be prevented?						
No	17(16.0)	15(10.3)	0.1961	4(3.60)	5(3.38)	0.9227
Yes	89(84.0)	130(89.)		107(96.4)	143(96.6)	
Early detection of cervical cancer is helpful?						
No	8(7.55)	12(8.11)	0.8700	3(2.73)	4(2.78)	0.9806
Yes	98(92.5)	136(91.9)		107(97.)	140(97.2)	
Have you heard about Pap smear test or Visual Inspection with Acetic Acid (VIA)?						
No	74(64.9)	94(62.3)	0.9132	11(9.57)	21(13.9)	0.0245
Yes	23(20.2)	37(24.5)		88(76.5)	122(80.8)	
Not sure	17(14.9)	20(13.3)		16(13.9)	8(5.30)	
Have you heard about HPV test?						
No	68(60.2)	106(70.2)	0.0284	7(6.14)	14(9.40)	0.4670
Yes	24(21.2)	32(21.2)		100(87.7)	126(84.6)	
Not sure	21(18.6)	13(8.61)		7(6.14)	9(6.04)	
Who can take Pap smear test or VIA or HPV test?						
Women	33(29.0)	64(42.4)	0.0229	94(81.7)	135(89.)	0.0833

Level of Knowledge of HPV, and Cervical Cancer. Table 4.4 presents data on the level of HPV and cervical cancer knowledge. Overall, prior to the educational intervention, respondents' level of knowledge of HPV, and cervical cancer were low, but improved at post-test. The majority of participants (81.7% of men and 84.7% of women) had poor knowledge of HPV and HPV vaccine at baseline. Following the intervention, participants' knowledge significantly improved, with poor knowledge persisting among less than 13%, while nearly 50% had high HPV-related knowledge. At pre-intervention, the level of cervical cancer knowledge among men and women was significantly different (0.0012), with no significant differences at post-intervention.

Table 4.4: Participants' Level of Knowledge of HPV, HPV Vaccine, Cervical Cancer and Cervical Cancer Screening Pre-Intervention and Post-Intervention

Variables	Pre-Intervention n (%)			Post-Intervention n (%)		
	Men	Women	<i>p</i>	Men	Women	<i>p</i>
Level of Knowledge of HPV and HPV Vaccine.						
Poor	94(81.7)	127(84.7)	0.9677	14(12.2)	19(12.6)	0.5916
Moderate	17(14.8)	13(8.67)		39(33.9)	57(37.8)	
High	4(3.48)	10(6.67)		62(53.9)	75(49.7)	
Level of Knowledge of Cervical Cancer and Cervical Cancer screening?						
Poor	46(40.0)	39(25.8)	0.0012	11(9.57)	4(2.65)	0.0702
Moderate	40(34.8)	46(30.5)		19(16.5)	26(17.2)	
High	29(25.2)	66(43.7)		85(73.9)	121(80.1)	

Stigma Associated with HPV Infection and Cervical Cancer. In terms of stigma (see Table 4.5), no significant changes were observed pre/posttest in five out of the six domains; however, there were no statistically sig differences except for “Do you believe telling someone you have (had) cervical cancer is risky”. Some participants moved from uncertainty (i.e., “not being sure”) at pre-test to blaming or stigmatizing victims at post-

test. For example, at pre-test, 11.5% of men and 16.6% of women indicated testing positive to HPV infection was associated with having multiple sex partners. However, at post-test, 33.9% of men and 32.5% of women agreed that a positive HPV test result *did mean* the person had multiple sex partners. Similar response trends were noted in relation to the perception of individuals with cervical cancer as having had multiple sexual partners.

Of note, gendered perceptions of disclosure of having cervical cancer were not very different before the intervention but became statistically significant (0.0394) after the intervention. At pre-test, 20.2% of men and 35.1% of women agreed disclosing ones' status is risky, whereas following the educational intervention, 31.3% of men and 43.1% of women agreed that it is risky for an individual to disclose their status.

Factors associated with high knowledge of HPV and cervical cancer. The results of logistic regression analyses on knowledge of HPV and HPV vaccine at post intervention (Table 4.6). The odds of high knowledge of HPV and HPV vaccine is 3.4 times for male participants (ages 45-54) than the odds of high knowledge of HPV and HPV vaccine for participants who are 55 years and above. The adjusted odds of having high knowledge of HPV and HPV vaccine is 1.7 times for male single participants and 2.4 times for those who earn more than 100,000 naira than the odds of married participants and those who earned less than 50,000 naira respectively. These categories were found to be statistically different. However, no statistically significant differences were observed based on their age group, marital status, education and income for the women.

Table 4.5. Stigma Associated with HPV Infection and Cervical Cancer

Variables	Pre-Intervention n(%)			Post-Intervention n(%)		
	Men	Women	<i>p</i>	Men	Women	<i>p</i>
Do you think people with HPV infection sleep with a lot of different people?						
No	22(19.5)	34(22.5)	0.2729	35(30.4)	43(28.5)	0.5948
Yes	13(11.5)	25(16.6)		39(33.9)	49(32.5)	
Not sure	78(69.0)	92(60.9)		41(35.7)	59(39.0)	
Do you think people with cervical cancer sleep with a lot of different people?						
No	30(26.5)	46(30.5)	0.6407	43(37.4)	47(31.1)	0.1624
Yes	15(26.5)	16(10.6)		33(28.7)	40(26.5)	
Not sure	68(60.2)	89(58.9)		39(33.9)	64(42.4)	
Do you think people who have (had) cervical cancer caused their problem?						
No	43(37.7)	67(44.4)	0.0835	52(45.2)	58(38.4)	0.3982
Yes	7(6.14)	20(13.3)		26(22.6)	41(27.2)	
Not sure	64(56.1)	64(42.4)		37(32.20)	52(34.4)	
Do you think that a person affected by cervical cancer is disgusting?						
No	59(51.8)	66(43.7)	0.5848	74(64.4)	87(57.6)	0.5245
Yes	10(8.77)	28(18.5)		10(8.70)	23(15.2)	
Not sure	45(39.5)	57(37.8)		31(27.0)	41(27.1)	
Do you feel uncomfortable around someone affected by cervical cancer?						
No	48(42.1)	67(25.3)	0.2068	62(54.4)	80(53.0)	0.9639
Yes	17(14.9)	37(14.0)		20(17.5)	30(20.0)	
Not sure	49(43.0)	47(31.1)		32(28.1)	41(27.2)	
Do you believe telling someone you have (had) cervical cancer is risky?						
No	51(44.7)	53(35.1)	0.6826	54(47.0)	47(31.1)	0.0394
Yes	23(20.2)	53(35.1)		36(31.3)	65(43.1)	
Not sure	40(35.1)	45(29.8)		25(21.7)	39(25.8)	

Table 4.6: Regression Analysis of Factors Associated with High Knowledge of HPV and HPV Vaccination at Post Intervention

	Men			Women		
	Odds Ratio	95% CI for OR		Odds ratio	95% CI for OR	
		Lower	Upper		Lower	Upper
Age group						
18 - 24	0.3739	0.05972	2.3408	3.1758	0.3236	31.1711
25 - 34	0.8051	0.4656	1.3921	0.7361	0.4640	1.1678
35 - 44	1.6675	0.8422	3.3017	1.0653	0.6087	1.8645
45 - 54	3.4232	1.1402	10.2775	1.7584	0.7613	4.0614
55+ (referent)						
Marital status						
Single	1.7276	1.0622	2.8098	1.1548	0.7892	1.6898
Married (referent)						
Education Level						
No formal education	1292187	0	Infy			
Primary education	0.1805	0.02102	1.5507	1.632E-7	0	Infy
Secondary education	0.6113	0.9522	1.3259	0.9694	0.5081	1.8498
Tertiary education (referent)						
Monthly income (Nigerian Naira)						
Less ₦50,000 (referent)						
₦50-100,000	0.8099	0.4135	1.5865	1.0108	0.5334	1.9154
Above ₦100,00	2.4497	1.2222	4.9099	1.7922	0.8367	3.8388

Regarding knowledge of cervical cancer and cervical cancer screening at post intervention (Table 4.7), for participants aged 35-44, the odds of high knowledge of cervical cancer and cervical cancer screening is 3.6 times for men and 8.1 times for women than the odd of high knowledge for men and women who were 55 years and above. Additionally, men had 1.9 times and women had 3.5 times the odds of high knowledge of cervical cancer and cervical cancer screening than the participants aged 55 years and above. In terms of marital status, a significant difference was observed. The odds of high knowledge of cervical cancer and cervical cancer screening for single male participants

were 2.1 times and 4 times for single female participants than the odds for married participants.

Table 4.7: Logistic Regression Estimates (Odds Ratio) of High Knowledge of Cervical Cancer at Post Intervention.

	Men			Women		
	Odds Ratio	95% CI for OR		Odds ratio	95% CI for OR	
		Lower	Upper		Lower	Upper
Age group						
18 - 24	0.4189	0.06733	2.6069	3.2182	0.3258	31.7851
25 - 34	1.9317	1.0640	3.5068	3.5477	1.9945	6.3105
35 - 44	3.6420	1.6136	8.2204	8.1928	3.2415	20.7074
45 - 54	1.7506	0.5236	5.8533	6.8627	2.0162	23.3600
55+ (referent)						
Marital status						
Single	2.1985	1.1863	4.0745	4.0408	2.0076	8.1331
Married (referent)						
Education Level						
No formal education	2.245761	0	Infy			
Primary education	0.2192	0.02544	1.8882	0.4258	0.01135	15.9670
Secondary education	1.1797	0.5326	2.6130	2.4383	1.1708	5.0780
Tertiary education (referent)						
Monthly income (Nigerian Naira)						
Less ₦50,000 (referent)						
₦50-100,000	2.1751	1.0283	4.6005	6.0326	2.3406	15.5482
Above ₦100,00	4.3848	1.9412	9.9047	6.2316	2.1353	18.1865

Discussion

To the best of our knowledge, this study is the first in Nigeria to compare the efficacy of an educational intervention in improving levels of awareness and knowledge of HPV, HPV vaccine, cervical cancer and cervical cancer screening among men and women and to examine the effect of an educational intervention on stigma associated with HPV and cervical cancer. These findings indicate that community-based health education, whether delivered to groups or to individuals, is a promising strategy to increase HPV and cervical cancer awareness and knowledge among urban-dwelling

Nigerian men and women. Similar to prior research conducted in other regions of Nigeria and other countries in sub-Saharan Africa, at pre-intervention we observed low levels of awareness and knowledge of HPV, cervical cancer and preventive measures (Gana et al., 2016; Odunyemi, Ndikom, & Oluwatosin, 2018; Rwamugira, Maree, & Mafutha, 2017; Williams & Amoateng, 2012). A study in Singapore found that only 16% of the sample of men had ever heard of the HPV (Pitts, et al., 2009). Increased awareness and knowledge of HPV infection is vital for both men and women, given the significant health complications of HPV infection in both groups.

Of note, post-intervention awareness and knowledge improved remarkably among both men and women, with more than 80% correctly answering specific questions about the risk factors, mode of transmission, and the preventive methods at post-test. Similarly, Adamu et al., (2012) examined the impact of health information on knowledge of cervical cancer in North-Western Nigeria and reported a significant difference ($p < 0.001$) in knowledge with a mean score 63.7% among female teachers who participated in the intervention. Following a nurse-led educational intervention in Abuja, Nigeria, Odunyemi and colleagues (2018) reported a significant increase (mean score 9.6 ± 7.2 to 21.5 ± 6.2) in cervical cancer and HPV knowledge. Prior to the educational intervention, 83.4% of the participants had poor knowledge of HPV and HPV Vaccine, compared to 12.4% following the intervention, and those with good knowledge increased from 5.28% to 51.5% ($p < 0.0001$). Among participants with poor knowledge of cervical cancer and cervical screening, the proportion reduced from 32% to 5.64%, whereas those with very good knowledge increased from 35.7% to 77.4% ($p < 0.0001$).

Community members' knowledge of the association of HPV as a STI sexually transmitted infection may impede cervical cancer prevention efforts. The stigma associated with STIs is increasingly recognized as a critical psychosocial element that may affect uptake of preventive measures. A study among men in Ghana, found that the most common belief was that cervical cancer is caused by frequent sex resulting in physical damage (Williams & Amoateng, 2012). Of note, the proportion of participants in this community-based research who associated testing positive for HPV infection with having had multiple sex partners increased significantly after the intervention in both groups, as did the perception of women diagnosed with cervical cancer. This is similar to the finding by Fernandez, et al., (2009), who noted men reported they would suspect infidelity by their partner, if their partner told them she was HPV positive. They also noted that even with increased understanding that men's own infidelity could be the cause of their partner's infection, most men still stated that their first reaction would be to question the woman's faithfulness.

Of further note is the post-intervention increase of men and women who indicated individuals with cervical cancer had caused their own problem increased after the intervention. These findings are consistent with previous research linking awareness of HPV as sexually transmitted with significantly higher levels of stigma and shame (McCaffery et al., 2006; Waller, et al., 2007). Similarly, research by Shepherd and Gerend (2014) reported participants rated a patient with cervical cancer as more dirty, dishonest and unwise when the cause of the cancer was specified than when it was not specified. The findings from this research suggest the risk that raising awareness of HPV as a sexually transmitted infection may potentially increase feelings of stigma and shame among those

infected. The increased stigma observed in this study indicate that most of the participants are in Stage 2, unengaged, and stage 3, decision making time, of the Precaution Adoption Process Model. This means there are significant gaps in their knowledge about HPV and cervical cancer, including risk and protective factors. Specifically, continuing dissemination of appropriate, culturally tailored and scientifically sound information among diverse groups could contribute to the reduction of stigma associated with HPV and cervical cancer, which over time could contribute to better health outcomes.

Stigma associated with lack of information is a common barrier to disclosure, particularly in relation to information with sexual connotations. An individual's ability and willingness to disclose their status is dependent on the societal perception and feeling toward HPV and cervical cancer. Following the educational intervention, respondents' perceptions regarding the risk of disclosing to others that they have cervical cancer increased in both groups, with more women not being willing to disclose their status. Our finding revealed a statistically significant difference by gender in some of the key questions such as who can contract HPV and knowledge of HPV vaccine and cervical cancer at both preintervention and postintervention. More women than men had more stigmatized belief about disclosing of status. In contrast, Perrin and colleagues (2006) reported that the majority (65%) of the women in their study had disclosed their HPV diagnosis to at least one other person. The finding may be due to internalized stigma associated with social expectation of women in Nigeria and the patriarchal culture of the society. A permanent change in awareness, knowledge and stigma associated with HPV and cervical cancer may be achieved by adequate and sustained health education programs with or without other interventions. Several strategies for stigma reduction tailored at intrapersonal,

interpersonal, community and organizational/institutional level are reported in the literature (Heijnders, & Van Der Meij, 2006; Stangl et al., 2013). These strategies include counselling, cognitive behavioral therapy, self-help, advocacy and support groups (Stangl et al., 2013).

Conclusion

Awareness, knowledge, perceptions, and attitudes contribute to women's exposure to and susceptibility to HPV infection, and subsequently, to cervical cancer. In Nigeria, given the high prevalence of HPV infection, there is an associated high prevalence of cervical cancer. An increase in HPV and cervical cancer morbidity and mortality have contributed to the urgent need to scale up HPV vaccine and cervical screening efforts. This research assessed the effectiveness of a community-based educational interventions in improving HPV awareness and knowledge among urban-dwelling Nigerian men and women. The untoward finding of increased stigma associated with HPV and cervical cancer following the educational intervention is not surprising, given that HPV is a sexually transmitted virus, and as such may be associated with stigma. Given that stigma is a possible hindrance to the uptake of HPV vaccine and screening, there is an urgent need for implementing culturally tailored stigma reduction interventions at intrapersonal, interpersonal, community and organizational/institutional to combat stigma associated with HPV and cervical cancer. To reduce the negative connotations associated with the HPV virus using health education, public information should focus on the cause of the condition, asymptomatic nature of HPV infection, its widespread prevalence, and the fact that most sexually active people will contract HPV at some point in their lives.

Limitations

There are several limitations to the methods and implications of this research. We used a self-administered survey to assess the impact of this tailored, community-based educational intervention and therefore were not able to identify any causal relationships between knowledge, attitudes, or practices overtime. Furthermore, the nature of the convenience sampling and urban setting limits generalizability to the larger Nigerian adult population. Of note, the majority of the participants were college educated, which is not representative of the general Nigerian population. Given the research included only participants who can read and write in English, the sample also does not reflect non-English speaking Nigerians.

Recommendations for further research

Educational interventions are effective at improving awareness, knowledge and willingness to participate in preventive and screening services among diverse populations. However, educational interventions do not necessarily remove or ameliorate structural barriers to uptake of preventive and screening services. There is a need for further exploration of the effectiveness of targeted educational interventions in improving HPV and cervical cancer-related stigma in different circumstances, contexts and settings in SSA. Further research is warranted to explore and uncover stigma and other emotional factors that may influence HPV vaccination and screening utilization. It is important to assess HPV knowledge and attitudes among diverse groups of Nigerian women, men, healthcare providers and community leaders. To examine sources of stigma and develop culturally-tailored strategies to combat the stigma, further research with larger samples of married men, unmarried men in heterosexual relationship(s) and male community leaders is

warranted. There is also a need for further research to identify other educational interventions and approaches to increase male involvement in HPV and cervical cancer prevention, not only in Nigeria, but in other countries and cultures.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

Conclusion

The findings from this study support that health education is an effective tool for increasing awareness, enhancing knowledge and encouraging willingness to engage in HPV vaccination and screening services among Nigerian adults. Among the 266 urban-dwelling Nigerian adults who participated in the study, the majority had low levels of knowledge of HPV and HPV Vaccine at baseline. However, after exposure to the community-based educational intervention, knowledge levels clearly increased. Of note, very few of the 266 participants reported having received the HPV vaccine or having a family member who had been vaccinated or screened for HPV. Following exposure to the community-based, culturally tailored educational intervention, there was a clear increase in reported intent to be vaccinated and to encourage a family member to receive HPV vaccination and cervical cancer screening. Of note are the findings related to negativity in relation to HPV and cervical cancer stigma. We observed negative perception about HPV and cervical cancer increased with increased knowledge of HPV and cervical cancer. This may be due to increased awareness on sexual nature of HPV infection, as sexually transmitted virus has a relationship with stigma. Therefore, increased continuing and sustained public education on the asymptomatic nature of HPV, its prevalence and that most sexually active people will contract HPV at some point in their life may help reduce the negative feeling associated with the virus.

Unique aspects of this research were the inclusion of information on HPV infection, cervical cancer and the preventive measures to both men and women in urban settings. Earlier intervention studies in Nigeria have focused solely on women and cervical cancer and screening (Adamu, Abiola, & Ibrahim, 2012; Abiodun, Olu-Abiodun, Sotunsa, & Oluwole, 2014; Chigbu, Onyebuchi, Onyeka, Odugu, & Dim, 2017; Gana, Oche, Ango,

Raji, & Okafoagu, 2016; Mbachu, Dim, & Ezeoke, 2017; Wright, Kuyinu, & Faduyile, 2010; Ndikom et al, 2017; Ndikom, Ofi, Omokhodion & Adedokun, 2017; Odunyemi, Ndikom, & Oluwatosin, 2018). This research is the first to include men and have a combined focus on HPV infection, cervical cancer and specific preventive measures (i.e., HPV vaccination). Incorporating educational initiatives into community-based, non-governmental and government-sponsored programs will lead to both increased awareness and uptake of preventive measures. Other strategies to increase HPV vaccination include school-based and workplace vaccination opportunities. Possible deterrents to HPV immunization uptake include the sexual nature of HPV infection and the psychosocial factors related to sexually transmitted diseases. Health educators and healthcare professionals must consider these cultural and social factors in planning interventions to improve HPV immunization uptake.

Of particular note was the importance of men's participation in this research. This study serves as an example of the importance of mobilizing and educating men as partners rather than barriers in relation to women's health issues. Given men's roles and influence in sexual and reproductive health access in SSA, further evidence-informed approaches that include men as active participants and partners are needed to challenge the multiple social, economic, and cultural barriers to HPV vaccination and screening uptake. The findings of this study lay the groundwork for further research-based interventions to promote involvement of men in the reduction of HPV and cervical cancer in Nigeria. This study utilized the Theory of Gender and Power, applied to the men and women living in Anambra. Caution should be taken when generalizing the results to other Nigerians. More

research is needed to identify the most effective theory-based interventions for evidence-based nursing practice in this population.

Implications for Nursing Practice

Given that nurses are in a position to effect change and to promote healthy preventive practices, the study findings are relevant to nursing practice, research and policy. The positive impact of this targeted educational intervention in improving awareness, knowledge and intention to take HPV vaccine and cervical cancer screening among urban Nigerian men suggests that similar initiatives should be developed for other populations and settings. However, nurses and nurse researchers also need to pay attention to the gaps in the HPV knowledge, lack of uptake of preventative practices, and stigma regarding HPV and cervical cancer, in order to develop and implement culturally focused and tailored interventions to improve HPV vaccine and cervical cancer screening among diverse populations and settings in Nigeria. Nurses need to be aware of the clinical implications for population and be prepared to inform and educate both men and women in Nigeria.

At the individual level, these findings may help inform nursing interventions with female patients who lack the ability to make health decisions and influence decision making by involving their significant others. Also, discussing the patient's beliefs related to HPV and cervical cancer and perceptions of vulnerability may contribute to reducing the social stigma related to these diseases. Nurses can facilitate HPV vaccination and screening uptake by participating in community health events and providing home visits. Recommending and communicating accurate information to patients is an important role for nurses. With ongoing rural to urban and international migration, it is important to

incorporate knowledge of new cultures and languages into nursing curriculums, at both the baccalaureate and graduate levels, and to expose practicing nurses to various cultures and sociocultural factors influencing health and illness. More research on HPV and cervical cancer screening and the application of the Theory of Gender and Power among the Nigerian population is needed. The current study provided information about the applicability of the Precaution Adoption Process Model and the Theory of Gender and Power in knowledge and intention to take HPV vaccination and cervical cancer screening in Nigeria. Nurses who can access different tribes and region in Nigeria could incorporate these theories into intervention strategies aimed at increasing the uptake of HPV vaccine and cervical screening.

Recommendations

Based on the findings of this research, an effective community-based education program for Nigerian urban-dwelling adults should incorporate information that reflects the target population's needs, interests, culture, values and belief. It should also integrate activities and recommendations related to primary, secondary, and tertiary levels of prevention. This targeted, culturally-tailored community-based educational intervention improved awareness, knowledge, and intent to take and or encourage HPV vaccination and cervical cancer screening services. The findings indicate that both enhancing public understanding of HPV and the relationship of the virus and cervical cancer and increasing uptake of effective preventive measures are important steps.

There are several opportunities for future research pertaining to methodology, content area, and refinement of the conceptual framework. More evidence is required to further explore the effectiveness of educational interventions in improving HPV and

cervical cancer-related stigma in different circumstances, contexts and settings in SSA. Similar research should be conducted with larger and more diverse populations in both urban and rural areas of Nigeria and further investigations are warranted to assess if increased knowledge and intention actually translates into increased uptake of HPV vaccination and other preventive measures.

Due to the geographically limited sample, more widespread implementation among different geographic regions ethnic and religious populations across Nigeria is warranted in order to shed light on the long-lasting impact of HPV and cervical cancer education. Examples of areas for further investigation include the comparison of HPV knowledge, attitudes, and intent among more diverse samples of Nigerian men and women. Further research clearly is warranted in the area of stigma and other emotional factors that may influence decisions not to participate in HPV vaccination and screening. The roles and influence of men, particularly male community leaders, also need to be investigated in order to assess their roles in mitigating psychosocial barriers to HPV vaccination and screening in diverse areas of SSA.

Further research is necessary to identify other tailored educational interventions to encourage male participation and inclusion in HPV and cervical cancer prevention has shown that information without removing some of the social barriers may not yield the desired effects. There is a need to review and assess the various interventions used to increase HPV and cervical cancer knowledge and uptake in Nigeria in order to determine their reach and effectiveness. Lastly, it is important to develop culturally appropriate evaluation and feedback tools to assess the effectiveness of the programs and help create an intervention that is more effective in promoting HPV vaccination and cervical cancer

screenings. An understanding of the applicability of the Theory of Gender and Power to HPV vaccination and cervical cancer screening among in different cultural backgrounds is needed before planning Theory of Gender and Power interventions.

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APPENDIX A INFORMED CONSENT FORM

Introduction and Purpose

I am Chigozie Nkwonta, a third year PhD student in the College of Nursing at the University of South Carolina, USA. You are invited to take part in my study, which is my dissertation. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

I am conducting an educational intervention to increase HPV and cervical cancer knowledge and intention to screen for and take HPV vaccine. I want to assess what is known about HPV and cervical cancer, and if provision of information will increase its knowledge and intention to take HPV vaccine and cervical cancer screening. You have been purposively chosen to participate in the study because you live in Anambra state and is within the age or may have a dependent that is within the age for HPV vaccine and cervical cancer screening. If you do decide to take part, the rest of this paper contains information on what to expect. Please read it carefully. I am happy to answer any question you have about this study before you decide to participate.

Description of Study Procedures

If you choose to participate, the researcher will explain the purpose of the study and a step-by-step procedure for this study. Please, at the end of the information section with the researcher, feel very free to ask any questions you may have. Then, you will be asked to give consent. You can give verbal or written consent, depending on what you feel most comfortable to do.

If you are deemed eligible, you will be enrolled in the study. Once enrolled, you will complete a questionnaire at the beginning of the study. The questions contain information that describes you, on HPV, cervical cancer, HPV vaccine and cervical cancer screening. After completing the questionnaire, the researcher will give a talk on the topics or provide you with pamphlets contain information on the topics. After listening to the health talk or reading the pamphlets, you will be given the same questionnaire you filled in the beginning of the study. If you choose to participate, you do not need to write your name or give any information that will identify who you are. The questionnaire will be secured in a locked bag and later entered into a password protected computer. The information you filled on the questionnaire will be used for my research project. Any identifying information will be removed. The study is expected to last no longer than 2 hours, 30 minutes.

Risk and Benefits of Participation

There are no known risks associated with this study. However, the questions may cause you some discomfort since it involves questions about your personal practice of the HPV and cervical cancer preventive measures. Your participation in this study will increase your knowledge of HPV, cervical cancer, HPV vaccine and cervical cancer screening. Also, your participation will help inform more effective approaches to increasing

knowledge HPV and cervical cancer and uptake of the preventive measures. If you wish to learn more about the topic confidentially, you can ask further question after the study. I am willing and ready to answer your questions or enlighten you more on the topic.

Confidentiality

All the information that is collected will be kept strictly confidential. For the purpose of this study, your personal identification data such as name or ID number is not needed. However, if any detail that can identify you is written on the questionnaire, it will be removed when entering the data. An identification number will be assigned to each survey to protect your identity. All the information collected will be secured and will be destroyed at the end of my doctoral program.

Voluntary Participation

Your participation in this study is voluntary. If you decide to take part you are still free to withdraw at any time and without giving a reason. You are also free to refuse to answer any question. There is no penalty for refusing to participate or dropping from the study.

Contacts

Please let me know if you have any questions before you agree to participate. Please let me know if you do not understand any question or need more clarification. You may contact me at (404) 955-6515 or by email cnkwonta@email.sc.edu if you have any study related questions or problems.

Also, if you have questions or complaints about your treatment as a participant in this study. If this happens, you may contact the Office of Research Compliance at the University of South Carolina, Columbia, USA at (803) 777-7095.

Chigozie A. Nkwonta, PhD Candidate, RN/M
College of Nursing
University of South Carolina
Columbia, S.C. 29208

Deanne Hilfinger-Messias, PhD, RN
College of Nursing
University of South Carolina
Columbia, S.C 29208
(803) 576-6021

Signatures/Dates

Your signature indicates you understood the following information:

I have read and understood the project information sheet dated 11/20/2017.

I have been given the opportunity to ask questions about the study.

I agree to take part in the study.

I understand that my taking part is voluntary.

I can withdraw from the study at any time and I will not be asked any questions about why I no longer want to take part.

I understand my personal details such as name, phone number and address will not be requested for this study. I will receive a copy of this form.

I will sign this form as a proof of my consent to participate.

Signatures/Dates

Participants' Name

Participants' Signature/Dates

**APPENDIX B
QUESTIONNAIRE FOR MEN**

Section A -Demographic variables

To begin, I am going to ask you a few questions about yourself

- 1) Age (years) _____
- 2) Marital status- Single _____ Married _____ Others _____
- 3) Highest level of education - No formal education _____ Primary education _____
Secondary education _____ Tertiary education _____
- 4) Average monthly income (#)- below 50,000 _____ 51,000-100,000 _____ above 100,000 _____

Section B -Human Papilloma Virus (HPV)

5) Have you ever heard of the Human papilloma virus (HPV)? No__ Yes__ Not sure__
IF “yes” or “not sure” continue; if your answer is “no”, please go directly to question 12

6) How do you think one can get HPV (you can choose more than one answer)?

- _____ Physical contact
- _____ Dirty toilets
- _____ Poor personal hygiene
- _____ Sexual intercourse
- _____ I don't know

7) How do you know if someone has HPV (you can choose more than one answer)?

- _____ Itching in the genital area
- _____ Pain during urination
- _____ Genital discharges
- _____ Genital rash
- _____ No symptoms
- _____ I don't know

8) Who can contract HPV?

- _____ Male only
- _____ Female only
- _____ Male and female
- _____ I don't know

9) Which of the following increases the risk of getting HPV (you can choose more than one answer)?

- _____ Poor diet
- _____ Smoking
- _____ Poor personal hygiene
- _____ Multiple sexual partners

_____ I don't know

10) Tick the disease you think HPV can cause?

_____ Cancer of Anus

_____ Cancer of cervix

_____ Genital warts

_____ Cancer of Penis

_____ Cancer of mouth and throat

_____ Cancer of Vagina

_____ I don't know

11) How likely do you think you or any of your family member will contract HPV?

Not Likely _____ Likely _____ Very likely _____

12) Have you heard about HPV vaccine? No _____ Yes _____ Not sure _____

13) Who can take the vaccine?

_____ Boys only

_____ Girls only

_____ Boys and girls

_____ Adult men and women

_____ Children

_____ I don't know

14) Have you or anyone in your family had HPV vaccine, If Yes, who?

Me _____ Wife _____ Daughter _____ Son _____ Others _____ None _____

15) How important is it for you or your family member to take HPV vaccine?

Very important _____ Maybe important _____ Not important _____

16) Do you plan to take HPV vaccine? No _____ Yes _____ Maybe _____

17) Will you encourage your family member or friends to take HPV vaccine?

No _____ Yes _____ Maybe _____

18) If yes, why will you get or encourage your family member to take up HPV vaccine?

19) If no, why will you not get or encourage your family member to take up HPV vaccine? _____

20) Who will you encourage to take HPV vaccine (you can choose more than one answer)?

Wife _____ Daughter _____ Son _____ Others _____ None _____

21) Will you pay to receive or for a family member to get HPV vaccine, If the vaccine cost too much? No _____ Yes _____ Maybe _____

SECTION C: Cervical Cancer

Now I am going to ask you some questions about cervical cancer.

22) Have you ever heard of cervical cancer? No _____ Yes _____ Not sure _____

23) Which of the following do you think increases the risk of getting cervical cancer (you can choose more than one answer)?

- _____ Lack of personal hygiene
- _____ Poor diet
- _____ Hereditary (run in the family)
- _____ Smoking
- _____ Multiple sexual partners
- _____ I don't know

24) Do you think cervical cancer is associated with an infection? No _____ Yes _____

25) If yes in question No 20; what type of infection is cervical cancer associated with?

- _____ Human immunodeficiency virus (HIV) infection
- _____ Syphilis infection
- _____ Human papilloma virus (HPV) infection
- _____ I don't know

26) Cervical cancer is a severe disease. No _____ Yes _____

27) Cervical cancer be prevented? No _____ Yes _____

28) Early detection of cervical cancer is helpful? No _____ Yes _____

29) How likely do you think any of your family member will develop cervical cancer

Not Likely _____ Likely _____ Very likely _____

30) Have you heard about Pap smear test or Visual Inspection with Acetic Acid (VIA)?

No _____ Yes _____ Not sure _____

31) Have you heard about HPV test? No _____ Yes _____ Not sure _____

32) Who can take Pap smear test or VIA or HPV test?

- _____ Men
- _____ Women
- _____ Boys
- _____ Girls
- _____ I don't know

33) Has anyone in your family had a pap smear, If Yes, who? (you can choose more than one answer)? Wife _____ Daughter _____ Others _____ None _____

34) How important is it for your family member to take a Pap smear test?

Not important _____ Maybe important _____ Very important _____

35) Will you encourage any of your family member to receive pap smear? No _____

Yes _____ Not sure _____

36) If yes, why will you encourage your family member to receive pap smear?

37) If no, why will you encourage your family member to receive pap smear?

38) Will you pay for a family member to receive a pap smear; if the test cost too much?

No _____ Yes _____ Not sure _____

Now I am going to ask you some questions about how you see people who had HPV infection and cervical cancer

39) Do you think people with HPV infection sleep with a lot of different people?

No _____ Yes _____ Not sure _____

40) Do you think people with cervical cancer sleep with a lot of different people?

No _____ Yes _____ Not sure _____

41) Do you think people who have (had) cervical cancer caused their problem?

No _____ Yes _____ Not sure _____

42) Do you think that a person affected by cervical cancer is disgusting?

No _____ Yes _____ Not sure _____

43) Do you feel uncomfortable around someone affected by cervical cancer?

No _____ Yes _____ Not sure _____

44) Do you believe telling someone you have (had) cervical cancer is risky?

No _____ Yes _____ Not sure _____

**APPENDIX C
QUESTIONNAIRE FOR WOMEN**

Section A -Demographic variables

To begin, I am going to ask you a few questions about yourself

- 1) Age (years) _____
- 2) Marital status- Single _____ Married _____ Others _____
- 3) Highest level of education - No formal education _____ Primary education _____
Secondary education _____ Tertiary education _____
- 4) Average monthly income (#)- below 50,000 _____ 51,000-100,000 _____ above 100,000 _____

Section B -Human Papilloma Virus (HPV)

- 5) Have you ever heard of the Human papilloma virus (HPV)? No ___ Yes ___ Not sure ___

IF “yes” or “not sure” continue; if your answer is “no”, please go directly to question 12

- 6) How do you think one can get HPV (you can choose more than one answer)?

- _____ Physical contact
- _____ Dirty toilets
- _____ Poor personal hygiene
- _____ Sexual intercourse
- _____ I don't know

- 7) How do you know if someone has HPV (you can choose more than one answer)?

- _____ Itching in the genital area
- _____ Pain during urination
- _____ Genital discharges
- _____ Genital rash
- _____ No symptoms
- _____ I don't know

- 8) Who can contract HPV?

- _____ Male only
- _____ Female only
- _____ Male and female
- _____ I don't know

- 9) Which of the following increases the risk of getting HPV (you can choose more than one answer)?

- _____ Poor diet
- _____ Smoking
- _____ Poor personal hygiene
- _____ Multiple sexual partners

_____ I don't know

10) Tick the disease you think HPV can cause?

_____ Cancer of Anus

_____ Cancer of cervix

_____ Genital warts

_____ Cancer of Penis

_____ Cancer of mouth and throat

_____ Cancer of Vagina

_____ I don't know

11) How likely do you think you or any of your family member will contract HPV?

Not Likely _____ Likely _____ Very likely _____

12) Have you heard about HPV vaccine? No _____ Yes _____ Not sure _____

13) Who can take the vaccine?

_____ Boys only

_____ Girls only

_____ Boys and girls

_____ Adult men and women

_____ Children

_____ I don't know

14) Have you or anyone in your family had HPV vaccine, If Yes, who?

Me _____ Husband _____ Son _____ Daughter _____ Others _____ None _____

15) How important is it for you or your family member to take HPV vaccine?

Very important _____ Maybe important _____ Not important _____

16) Do you plan to take HPV vaccine? No _____ Yes _____ Maybe _____

17) Will you encourage your family member to take HPV vaccine?

No _____ Yes _____ Maybe _____

18) If yes, why will you get or encourage your family member to take up HPV vaccine?

19) If no, why will you not get or encourage your family member to take up HPV vaccine? _____

20) Who will you encourage to take HPV vaccine (you can choose more than one answer)?

Daughter _____ Son _____ Others _____ None _____

21) Will you pay to receive or for a family member to get HPV vaccine, If the vaccine cost too much? No _____ Yes _____ Maybe _____

SECTION C: Cervical Cancer

Now I am going to ask you some questions about cervical cancer.

22) Have you ever heard of cervical cancer? No _____ Yes _____ Not sure _____

23) Which of the following do you think increases the risk of getting cervical cancer (you can choose more than one answer)?

_____ Lack of personal hygiene

- Poor diet
 Hereditary (run in the family)
 Smoking
 Multiple sexual partners
 I don't know
- 24) Do you think cervical cancer is associated with an infection? No _____ Yes _____
- 25) If yes in question No 20; what type of infection is cervical cancer associated with?
- Human immunodeficiency virus (HIV) infection
 Syphilis infection
 Human papilloma virus (HPV) infection
 I don't know
- 26) Cervical cancer is a severe disease. No _____ Yes _____
- 27) Cervical cancer be prevented? No _____ Yes _____
- 28) Early detection of cervical cancer is helpful? No _____ Yes _____
- 29) How likely do you think you or any of your family member will develop cervical cancer
 Not Likely _____ Likely _____ Very likely _____
- 30) Have you heard about Pap smear test or Visual Inspection with Acetic Acid (VIA)?
 No _____ Yes _____ Not sure _____
- 31) Have you heard about HPV test? No _____ Yes _____ Not sure _____
- 32) Who can take Pap smear test or VIA or HPV test?
- Men
 Women
 Boys
 Girls
 I don't know
- 33) Have you or anyone in your family had a pap smear, If Yes, who? (you can choose more than one answer)? Me _____ Daughter _____ Others _____ None _____
- 34) How important is it for you or your family member to take a Pap smear test?
 Not important _____ Maybe important _____ Very important _____
- 35) Do you plan to go for cervical cancer screening? No _____ Yes _____ Not sure _____
- 36) Will you encourage your family member to go for cervical cancer screening?
 No _____ Yes _____ Maybe _____
- 37) If yes, why will you encourage your family member to go for cervical cancer screening?

- 38) If no, why will you encourage your family member to go for cervical cancer screening?

39) Will you pay to receive or for a family member to receive a pap smear; if the test cost too much? No _____ Yes _____ Not sure _____

40) I can only take HPV vaccine or screening with my husband's support? No ____ Yes ____

41) I need my husband's permission to use health care services? No ____ Yes ____

Now I am going to ask you some questions about how you see people who had HPV infection and cervical cancer

42) Do you think people with HPV infection sleep with a lot of different people?

No _____ Yes _____ Not sure _____

43) Do you think people with cervical cancer sleep with a lot of different people?

No _____ Yes _____ Not sure _____

44) Do you think people who have (had) cervical cancer caused their problem?

No _____ Yes _____ Not sure _____

45) Do you think that a person affected by cervical cancer is disgusting?

No _____ Yes _____ Not sure _____

46) Do you feel uncomfortable around someone affected by cervical cancer?

No _____ Yes _____ Not sure _____

47) Do you believe telling someone you have (had) cervical cancer is risky?

No _____ Yes _____ Not sure _____