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The Impact of Human Papillomavirus Educational Intervention Study on the Knowledge, Health Beliefs, Health Behaviors and Increasing the Use of Gardasil in Women of Color

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Background and Significance of the Study

Human papillomavirus (HPV) is the most common sexually transmitted disease in the United States and the precursor for a major factor of cervical cancers in women 20-29 years of age. Cervical cancer is the third most common malignancy of women worldwide with fifty percent occurrence in women 35-55 years of age. Females who receive the prophylactic HPV vaccine and women who are diagnosed early with the HPV lesion usually does not succumb to cervical cancer. While there is a decreased in cervical cancer in the US, an estimated 2,300 cases of newly diagnosed invasive cervical cancer among Black women in 2016 was reported (ACS: Cancer facts and figures for African Americans: 16-2018; CDC 2014). Louisiana ranks ninth for cervical cancer. Women in Louisiana are dying almost two times faster than Caucasian women. (Louisiana Tumor Registry, 2017).

There are a number of risk factors associated with the higher incidence and mortality of cervical cancers in AA women. In 2015, Watkins et al. identified knowledge deficit as a primary risk factor associated with a higher incidence and mortality of cervical cancer in AA women. Strohl (2015) identified lack of health prevention and adherence to medical protocols as higher risk factors for cervical cancer in AA women. While other researchers documented lack or limited access to Pap test and failure to follow-up as risk factors (Bosch, 2013; Watkins, 2015). Finally, Gelman (2013) and Sanders (2012) continue to identify distrust of healthcare personnel as a factor contributing to increase cervical cancer mortality and morbidity in AA women. There is a known relationship between HPV knowledge, attitudes, and beliefs about preventive health and the HPV vaccine. Studies show that, in general, women have a vague or poor knowledge of HPV and how the infection is transmitted and treated. Results from studies suggest there is a significant gap in knowledge of the association between genital HPV and cervical cancer (ACS, 2016-2018; Sanders, Thompson, Arnold, & Notaro, 2012). However, I could not locate an intervention study conducted with AA women in the US that used the six constructs of the Health Belief Model (HBM) and the intent of the subjects to use prophylactic HPV vaccines. This underscores the need to better understand how one's knowledge, health beliefs and behaviors impact health choices.

Three HPV vaccines were licensed by the United States Food and Drug Administration in 2006 for the prevention of cervical cancer for female's ages 9 through 26 years. In 2014, a 9-valent vaccine was added to this arsenal of HPV vaccines that impacted five more cancer causing HPV type viruses with an increase in age range of 45 years (Merck, 2007; Merck's 9-Valent Vaccine, 2015, US Food & Drug). Yet, the uptake of the HPV vaccine remains low especially in the AA women and children in Southeastern states (CDC: National Immunization Survey, 2015). Causes for the low HPV vaccine uptake included parents lack of HPV vaccine knowledge and myths associated with the vaccine. This lack of knowledge impedes parents from signing the HPV consent forms due to beliefs that children would become sexually active (Dorell et al., 2016; Obulaney et al., 2014; Warner et al., 2015). Hitzeman and Xavier (2012) conducted a systematic review of the Cochrane Gynecological Cancer Group Trials Register identified interventions that contributed to the increase in knowledge and follow-up rates in women of color. One of the findings (N=38) identified face to face and group education as effective strategies when used with women of color. Sharpe, Brandt, & McCree (2013), suggested proactive approaches in treatment with adequate infrastructure in the outpatient setting and an increase in cultural competencies for healthcare professionals (HCPs), which included staff, enhanced women desire to seek treatment, return for follow-up treatment, and become involved with HPV prophylactic vaccine. Hurst (2015) qualitative study concluded that women were aware of the term HPV, cervical cancer and the HPV vaccine; however, they lack knowledge between the links of HPV to cervical cancer.

Educational materials used by HCPs serve as a gold standard for disseminating healthcare information to consumers. This includes gender specific and culturally appropriate educational materials communicating effective health care messages. Additionally, educational materials incorporating pictures and languages of the specific study population contributes to the positive outcomes when used in intervention studies. In this study, the research team incorporated pictures as well as AA actors in using language at the 5th grade reading level (Kutner, Greenberg, Jin, & Paulsen, 2006; Musa et al., 2017).

The significance of this project is derived from Healthy People 2020 and the mission of the Center for Medicaid and Medicare Services to reduce the number of new cancer cases and lower the cost of cancer care (ACS, 2016-2018; CDC 2014; CMMS, 2013; Garr, 2020). While the estimated cost of treating a single case of localized cervical cancer averages twenty thousand dollars annually, it is two-fold for women experiencing late stage cervical cancer (Subramanian, Trogon, Ekwueme, & Gardner, 2010). Through better care for individuals and lower costs through healthcare improvements, CMMS remains committed to strengthening and modernizing the Nation's healthcare system.

Theoretical Framework

In 2015, a published article by Hurst et al., demonstrated how the Health Belief Model (HBM) was operationalized for this study. The model is composed of 6-constructs that suggest when an individual's health is threatened, previous knowledge and new knowledge is used to assist with a change in health behavior which increase health seeking behaviors (Bandura, 1986; Becker, Radius, & Rosenstock, 1978; Rosenstock, Stretcher, & Becker, 1988). This educational intervention study is focused on enhancing the decision of women to seek and take advantage of HPV prevention, increase adherence to follow-up post diagnosis of an abnormal Pap test and colposcopy and increase knowledge about prevention, treatment services, and/or strategies for accessing the healthcare system. Commensurate with CDC reports of various degrees of risk for HPV prevalence our research will enroll women who seek treatment at our public hospital.

The overall goal of this study was to increase HPV and cervical cancer knowledge, increase one's knowledge of modifiable health beliefs, health behaviors, and to increase HPV vaccination in African American women and their families. This goal was met by conducting an educational intervention study. The study objectives were to examine the following research questions:

- 1) Did participant's HPV and cervical knowledge increase after an educational media instructions intervention?
- 2) Did participant's health beliefs and health behaviors (risk factors) improve after an educational media instructions intervention?
- 3) Did intent to receive prophylactic HPV vaccine increase for the participant after an educational media instructions intervention?
- 4) Did women's intent for children and family members increase after an educational media instructions intervention?

Methodology

This study used a quasi-experimental research pretest/ posttest intervention design to evaluate HPV education intervention. Convenience sampling and the use of descriptive and correlational statistics were used to describe this study. The study received permission for implementation from the Louisiana State University Health Science Center and Dillard University Institutional Review Boards.

A total sample of 137 African American women between 19-65 years of age was recruited from the University Medical Center Women's Clinic (formally known as LSU Interim Hospital Ambulatory Outpatient Women's (OB/GYN-AWC) and Daughters of Charity Ambulatory OB/GYN clinic (DOC/AWC). Both clinics are located in southeastern Louisiana with a population of approximately 85,000 residents, of which 51% are African Americans (US Department of Commerce Bureau of the Census, 2010). Each clinic serves a large percentage of AA women (>65%) and renders comprehensive women healthcare consisting of prenatal and postnatal care, annual physicals and Pap smear screenings. The professional staff includes physicians, residents, registered nurses, and nurse practitioners with the physician and residents practicing at both facilities.

Written consents were obtained from all eligible participants prior to the submission and completion of the 72 item HPV questionnaire with one open-ended question. Inclusionary criteria included women with a history of noncancerous ASCUS Pap smear results, such as infections or

inflammation; and, the ability to read, write and speak English participated in the study. Exclusionary criteria included non-AA women, pregnant women, prisoner, or unstable medical conditions (uncontrolled chronic diseases or malignancy).

Instruments

Study participants were informed of the study via the research investigator and selected based on the inclusionary criteria with assistance from the Healthcare Provider (HCP). Each participant was informed of the study procedure which included the pretest and posttest questionnaires. The research study team consisted of nurses, physicians, residents, statisticians, and clinical research coordinators who served as Research Assistants (RA) for the study. Permission to use the HPV Questionnaire was given by the Lopez & McMahan (2007) who modified a tool developed by McPartland, Weaver, Lee, & Koutsky, (2005) to assess HPV knowledge in male college students. In 2014, the HPV questionnaire was modified for this study. Face and content validity of the questionnaire was assessed by the research investigator, two members of the research team, two health care professionals, and an external auditor. In this study, knowledge of HPV and cervical cancer, assessing perceived susceptibility, perceived severity, perceived barriers, health beliefs, health behaviors and self-efficacy (developed based on the HBM), and the intent to use HPV vaccines comprised the 63 items on the questionnaire. The other nine questions were related to sociodemographic information. Variables were added with specific questions that. The participant was given 30 to 45 minutes to complete the questionnaire.

In 2015, Hurst et al., conducted a study (N=15) to study to validate instruments for use in this study. A mixed-method approach using a 4-point Likert type questionnaire and semi structured interviews, participants rated the content, readability and appearance of an educational video and pamphlet. Greater than 86% of the participants rated the tools as acceptable with a change in color of the pamphlet and use of more illustrations in the pamphlet. The questionnaire, video and pamphlets were validated (Hurst, 2015b) and readability was assessed by a Microsoft Word, Flesch Kincaid reading level test. The consent forms and the questionnaires were separated, logged with a numerical number, and secured in a locked file cabinet.

Procedures

The initial intent was to have equal participants for the intervention and the control group. However, due to the move of the clinic to a new location, study participants were disbursed to various clinics within the new healthcare facility and outside the care facility. After collaboration with the research team and the external advisory committee, recruitment for the intervention group was closed with the 107 members and the control was closed with a total of 30 participants secondary to change of standards of care in the facility. The intervention was conducted from 2015 -2017. Pre-intervention consisted of participants completing the 72-item questionnaire (baseline), review of educational intervention followed by the post intervention.

Intervention

The utilization of gender specific and culturally appropriate educational materials was used. The video was titled HPV 101. The brochure was titled HPV and Cervical Cancer Knowledge: Giving Women the Power to make Healthy Choices.” The educational tools were used to increase HPV and cervical cancer knowledge thus impacting the health beliefs and health behaviors of AA women. An additional component of the intervention was to assess the intent of AA women to use prophylactic HPV vaccine, to assess intent to have their children and family members, and to examine what age would they recommend the vaccine be given. The pre-intervention questionnaire was administered to all control and intervention participants at baseline. The post intervention questionnaire was administered after the second intervention was completed. The intervention sessions were identical and included consenting, reading of the pamphlet and viewing of the video with lectures following the three components of the HPV video. Standard of care instructions were given by healthcare personnel.

Data analyses

Pre and post intervention data analyses results are reported. Data cleaning was conducted leaving a total of 98 questionnaires for analysis for the intervention group and a total of 30 respondents in the control baseline. A total of 76 questionnaires were collected in the second intervention group. Due to error in administration, data collection, or participant error in responding to questions a total of 6 participant questionnaires were deleted from final data analysis.

Results

Descriptive statistics were used to describe the current sample. The baseline intervention group of 98 demographic breakdown for race indicated 86 (87.75%) self-identified as African American or Black; 5 (5.1%) self-identified as Hispanic; 2(2%) self-identified as Caucasian, 5(5.1%) selected other or did not respond. The control baseline racial breakdown consisted of 27 (90%) self-identified as African American or Black, 2 (6.7%) self -identified as Hispanic and 1(3.3%) did not respond. The intervention and control groups are compared at baseline in **Table1**. No statistical differences were noted in the groups except annual income. Women in the control group earned more than half of monies earned by the women in the intervention group.

Comparison of the baseline intervention and control groups for HPV and cervical cancer knowledge is noted in **Table 2**. HPV and cervical cancer knowledge is based on responses from questions 11 and 13 from the HPV questionnaire.

Table 1

Comparison of control with intervention groups at baseline

Variable	Intervention, N=98, n (%)	Control, N=30, n (%)
Age		
1. 19-40	1. 51 (52.05%)	1.21 (70.00%)
2. 41-65	2. 42 (42.76%)	2. 9 (30.00%)
Marital Status		
1. Married	1. 12 (12.24%)	1. 4 (31.03%)
2. Single	2. 79 (80.31)	2. 25 (86.20%)
Education		
1. High School	1. 40 (40.81%)	1. 10 (33.33%)
2. High school + college, technical or Vocation	2. 51 (53.05%)	2. 20 (66.66%)
Number of Children		
1. None	1. 18 (18.56%)	1. 12 (41.37%)
2. 1-4 children	2. 61 (70.11%)	2. 17 (58.62%)
3. 5 or more children	3. 14 (7.22%)	3. 1 (3.44%)
Occupation		
1. Employed	1. 51 (56.12%)	1. 18 (60.00%)
2. Unemployed	2. 35 (29.63%)	2. 12 (40.00%)
Income		
1. <\$10,000	1. 39 (39.80%)	1. 2(6.66%)
2. \$10,000-\$40,000	2. 36 (56.84%)	2. 17(56.66%)
3. 40,001-\$60,000	3. 8 (8.06%)	3. 10 (33.33%)
4. \$60,000 or more	4. 0	4. 1 (3.33%)
Religion		
1. Baptist	1. 55 (56.12%)	1.20 (76.92%)
2. Catholic	2. 11 (11.22%)	2. 6 (23.07%)

- Missing data. Some totals do not equal N=98 or N=30.

The results indicate that over 75% of the women know about HPV and cervical cancer in the baseline intervention group. The baseline control group indicated more cervical cancer knowledge than the intervention group but showed less HPV knowledge showed less knowledge for HPV.

Table 2
HPV and Cervical cancer knowledge: Baseline Intervention and Control Group

Variable	Intervention, N=98, n (%)	Control, N=30, n (%)
1. HPV knowledge	71 (77.17%)	63 (70%)
2. Cervical Cancer knowledge	70 (76.08%)	82 (90.10%)

In Table 3, A statistical comparative study is performed between the participants who took the survey before watching the video known as Pretest (Baseline Data) and after watching the video known as Posttest (Intervention Data) in this study. As can be seen from the table and graph, the videos were very useful to raise the knowledge level of participant in Question#11,12,13,15,16,20,21,37,47,51,58,71. However in Question#53 and Q#54 the participants did not show the increase in knowledge level.

Table 3: Pre and Post Test Intervention

Q	PRE	POST
Q11	20%	22%
Q12	60%	62%
Q13	64%	70%
Q15	88%	92%
Q16	77%	88%
Q20	54%	58%
Q21	60%	78%
Q37	58%	68%
Q47	74%	78%
Q51	58%	68%
Q53	82%	70%
Q54	78%	68%
Q58	62%	70%
Q71	64%	74%

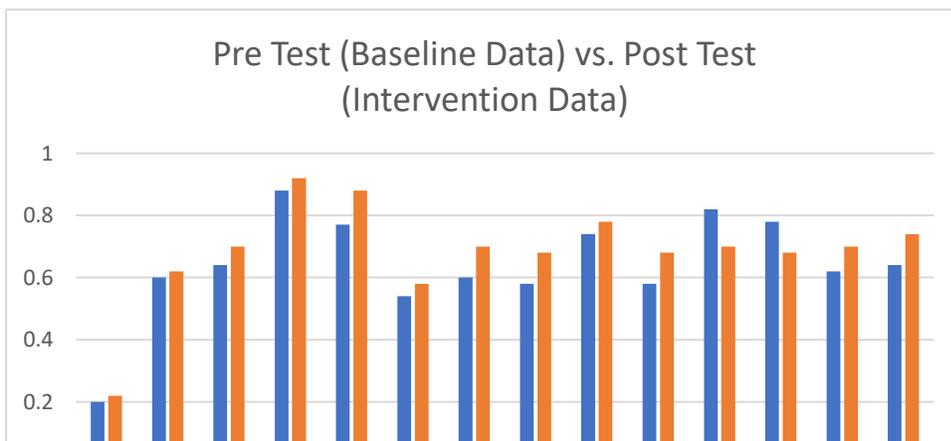


Table 4 identifies results to research questions 1-4 and compares the pre and post intervention results. Each variable was measured independent of each other to show more predictive change in health beliefs and health behaviors. Each construct in the HBM was operationalized using a “yes, no,” or “I don’t know” response. Selected questions results are listed here to show how each construct was analyzed. Questions 11 and 13 asked about knowledge related to HPV and cervical cancer. Perceived susceptibility was operationalized as the assessment of the woman’s ability to contract HPV or cervical cancer was measured analyzing response to questions #12 -How do you think a person gets Human papillomavirus (HPV)?; #20 - Do you think you could get Human Papillomavirus”?; and #21 - Do you think you could get cervical cancer”? Perceived severity was operationalized as the woman’s perception of her ability to contract HPV or cervical cancer. Perception was measured by analyzing question #15 - How often do you get a Pap smear (test)? and #16 -Why do women get Pap smears (test)? Participants responded to the next two questions with likert choices of not serious, less serious than other cancers, more serious than other cancers or I don’t know. Question #23 - How serious would it be if you were told that you had Human papillomavirus? and #24 - How serious would it be if you were told you have cervical cancer? Perceived barriers operationalized as the woman’s perception of what action must be taken to reduce risk for cervical cancer with responses to the following two questions. Question #54 - If my doctor/recommends that I take the HPV vaccine. Self-efficacy was operationalized as the use of interventions to make change in question #71 - If you could receive the HPV vaccine (shot) for free, would you agree taking the vaccine? The table also includes the scores for post intervention results which measured 1) participant’s intent to take the HPV vaccine and 2) participants intent to recommend the HPV vaccine to children and family members. The women responded to question #53 - I would consent to taking the HPV vaccine” and question #54 - If my doctor/nurse recommends that I take the HPV vaccine? Question #58 -Would you recommend that your children or family members take the HPV vaccine? was analyzed to measure the woman’s intent for children or family members to take the HPV vaccine.

Table 4

Selected Questions used to Assess HPV and Cervical Cancer Knowledge, the HBM constructs and the Intent for the woman to use HPV vaccine, and Intent to recommend children or family members to received HPV vaccine.

Question No.	Statement	Research question and HBM construct	Statistical Comparison Pre and Post Intervention
11.	What is Human papillomavirus (HPV)?	#1	2% increase
12.	How does a person get Human papillomavirus (HPV)?	#1	2% increase
13.	What is cervical cancer?	#1	6% increase
15.	How often do you have a pap smear (test)?	#1	4% increase
16.	Why do women get a Pap smear (test)?	#1	11% increase

20.	Do you think you could get Human papillomavirus (HPV)?	Perceived susceptibility	4% increase
21.	Do you think you could get cervical cancer?	Perceived susceptibility	18% increase
37.	How serious is it if you had cervical cancer?	Perceived severity	10% increase
47.	I don't have transportation to get to the clinic?	Barriers	4% increase
51.	I get most of my information about my health from (select all that apply)	#2 - Health beliefs, health behaviors	10% increase
53.	I would consent to taking the HPV vaccine if I need it.	#2 and #3 - Health beliefs, health behaviors	12% decrease*
54.	If my doctor/ nurse recommends that I take the HPV vaccine	#2 and #3- Health beliefs, health behaviors	10% decrease*
58.	Would you recommend that your children or family members receive the HPV vaccine?	#4	8% increase
71.	If you could receive the HPV vaccine (shot) free of charge, would you agree taking the vaccine?	#4 and Self-efficacy	10% increase

Discussion

The purpose of this study was to conduct an intervention study to determine if an educational intervention study would 1) increased HPV knowledge and cervical cancer knowledge, 2) improve health beliefs and health behaviors, 3) increase women's intent to use prophylactic HPV vaccine, and 4) increase women's intent to recommend prophylactic HPV vaccine to their children or family members. The majority of the participants in the study were single and had a minimum of a high school diploma with some technical or vocational skills. The mean age of the participants was between 19-40 years of age with an income ranging from ranged from \$10,000 to \$40,000. This correlates with the mean household income of \$36,999 for head of household in New Orleans, LA, when compared to the national annual household median income of \$60,000 (The Data Center, 2019). The women in this study had a 2% increase in HPV knowledge and a 6% increase in cervical cancer knowledge. Therefore, there is a need for reinforcement of HPV content to ensure that they can remember over a longer length of time. Women in their study were college age and the majority of the post intervention women over 40 years of age. Under the construct of perceived severity, women had a 10% increase indicating how they interpreted the seriousness for developing cervical cancer. Perceived barriers such as transportation or childcare was not identified by the group. Women who showed an increase in health beliefs and health behaviors also identified using resources such as pamphlets/brochures, online access, videos or TV. There was a significant decrease in women whose HCP recommended the vaccine. This finding may be linked to mistrust of the health care environment and missed opportunities by HCP (Espinosa, et al., 2017; Olivera, et al., 2017). When asked if they would take the vaccine if offered at no cost, there was a 10% decrease in the participants post intervention response. Women had a 10% response rate response during the post intervention when asked if they were willing to have their children or family members vaccinated. This finding is supported by Reiter (2011) who report on parents (n=376) who received a one-time HPV education intervention on HPV knowledge, HPV vaccine and beliefs of HPV vaccine found most parents (97%) indicated they would be willing to have their children vaccinated.

Conclusion

The HBM provided a common thread to link beliefs and behaviors. The results of this study support the value of educational intervention studies for increasing HPV and cervical cancer knowledge,

decreasing risk behaviors to change health behaviors, and increase the intent of women and their families to use prophylactic HPV vaccine. It adds to the body of knowledge when addressing the HPV and cervical cancer knowledge needs for AA women. It continues to identify those women at risk and the need to conduct further intervention studies to address their need have their children receive the HPV vaccine. VanWormer et al. (2017) reported similar findings in non-Hispanic women (N=221) of adolescents found that by improving parents' HPV vaccine attitudes was associated with improvements HPV vaccine uptake in their children. Therefore, AA women should continue to receive culturally and gender appropriate HPV information thus increasing children's HPV vaccine uptake.

Study limitations and future research

Findings from this study may not be generalizable due to the small sample size of the post intervention group. Widespread intervention studies among women in other southeastern cities in the United States would increase information related to HPV education using gender specific and culturally appropriate education materials. Future research should consist of a larger sample size to give more validity to the 6 constructs under the HBM. Convenience sampling was used to recruit participants in two sites in a defined location of the country. More research should also be conducted to correlate parent's willingness to vaccinate their children or family members

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