

The Impact of an Educational Intervention on Women's Knowledge and Perception Regarding Cervical Cancer and Human Papillomavirus Vaccines in Tanta City: Applying Health Belief Model

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Abstract: Background Cervical cancer is a significant health issue worldwide. The aim of this study was to studying the women's knowledge and perception regarding cervical cancer and human papillomavirus vaccines in Tanta City, it aimed also at increasing their awareness about cervical cancer screening through intervention with a health education program. **Methods:** This study was a self –control intervention study. The total sample included (125) women. Their ages ranged from 16 to 54 years. The studied population was chosen for being women as well as for being a part of the corner stone of the community which is in need for such education and knowledge. The study was conducting from the first of October (2011) to end of January (2012) among women in the four MCH centers of Tanta city. In the baseline interview all the women received an interview questionnaire for the pre-test and post test. It included personal data about women, cervical cancer, screening and vaccine assessment tool, and perception of women toward cervical cancer by applying Health belief Model (HBM), Intervention implemented through a health education program, for four weeks duration followed by a post-test. **Results:** It shows that more half of the women was aged 26-35 years and lived in urban areas. There was a significant improvement post intervention in all items of knowledge regarding cervical cancer. There was also a significant improvement post intervention in all items regarding (seriousness, susceptibility of disease, benefits of early detection, vaccination, total perception towards cervical cancer respectively), except the barriers which faced them. **Conclusion and recommendations:** the present study has raised lightened awareness on human papillomavirus (HPV) infection and cancer cervix. Health education was effective in improving the knowledge and perception of women regarding cervical cancer screening and vaccination. It founded the way be extend this program among all attendants of public gynecology clinics. An integrated educational and vaccination program should be implemented to prevent the risk of cancer cervix among high risk populations. HPV vaccination should be recommended before marriage for male and female. Flyers and pamphlet on HPV vaccination should be available in family planning clinic.

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1. Introduction

Cervical cancer is a significant health issue worldwide. It is the second most common cancer worldwide in women under 45 years of age, whereas it also affects a significant number of women over that age⁽¹⁾.

There are about 500,000 new cases and 250,000 deaths due to cervical cancer each year. Almost all cervical cancer cases (99%) are caused by human papillomavirus (HPV) infection⁽²⁾.

Egypt has a population of 25.76 millions women aged 15 years and older who are at risk of developing cervical cancer. The current estimates indicate that every year about 514 women are diagnosed with cervical cancer and 299 die from the disease. The incidence of cervical cancer in Egypt by cancer registry, AlGharbia is 2.1 per 100,000 women per year. This condition affects not only the health and lives of the women, but also their children, families and their communities at large⁽⁷⁾.

There are more than 100 different types of HPV, about 40 of which reach the anogenital region, and among them HPV 16 and 18 are the most common causes of cervical cancer and infections worldwide⁽³⁾. Infections with HPV are most commonly seen in young, sexually active women, with the highest prevalence in women under 25⁽⁴⁾. The other known risk factors for cervical cancer are the early onset of sexual activities, multiple sex partners, long term use of oral contraceptives, immunosuppressant's, smoking and specific dietary factors⁽⁵⁾. Generally, the women are infected with HPV in their teens and 20s, but cervical cancer can take up to 20 years after the initial HPV infection to develop⁽⁶⁾.

Although cervical cancer is acknowledged as a preventable disease, it is still the major health burden for women in many developing countries because an adequate scale of screening program is lacking⁽⁸⁾.

The screening test used for many years is the Papanikolaou test (Pap smear), which made the

secondary prevention possible. Primary prevention is now also achievable through vaccination HPV, which is responsible for 99.7 % of cervical cancer cases worldwide. Two safe and efficient vaccines have been in use for over a decade⁽⁹⁾.

In June 2006, the US Food and Drug Administration licensed HPV quadrivalent vaccine for use in girls and women aged 9 to 26 years as a vaccine against HPV types 6, 11, 16, and 18, which collectively account for 70% of cervical cancers and 90% of genital warts^(10, 11). The vaccine is administered by intramuscular injection, and the recommended schedule is a 3-dose series over a 6-month period. This dosage schedule presents unique challenges for a number of reasons. The socio-demographic characteristics of eligible HPV vaccine recipients vary widely and can strongly influence vaccine program coverage^(12, 13).

In order to improve screening rates and decrease the morbidity and mortality rates of cervical cancer, it is important to understand the underlying factors associated with the likelihood of getting screened. Research based on the Health belief model (HBM) to assess the beliefs, barriers, and perceptions of women who are at risk for cervical cancer, has been crucial in further developing the knowledge base⁽¹⁴⁾.

Nurses can provide health promotion counseling to the patients they serve in their day-to-day practice. They can fulfill a key role in health promotion and disease prevention, and they are in an ideal position to provide health education programs to young girls and women. It is necessary to make the nursing staff aware about cervical cancer, who can impart knowledge regarding cervical cancer and its prevention to the general public^(15, 16).

Counseling is considered very important in order to achieve the purpose of screening providing information on cervical cancer in the community and in health services is vital to raising awareness and reducing illness and death. Providing information through counseling from health care provider will help the woman to have the right information and correct misconceptions⁽¹⁷⁾.

Public health program such as screening women for precancerous changes, treating and follow-up care at early stages of the disease can potentially protect women from developing cervical cancer and thus reducing the incidence, morbidity and mortality from this condition⁽¹⁸⁾. For these reasons, the aim of this study was to determine the impact of an educational intervention on women's knowledge and perception regarding cervical cancer and human papillomavirus vaccines and applying Health belief Model.

Aim of the study:

The educational intervention was developed to assess knowledge and perceptions regarding the prevention, detection, and control of cervical cancer. Accordingly, the project included the following specific aims:

1. To evaluate an educational intervention for changes in knowledge about cervical cancer and Pap smear testing among participants.
2. To apply HBM components to evaluate the efficacy of the educational intervention on perceptions of cervical cancer and Pap smear testing.

Research hypothesis:-

- a. *Hypothesis:* The post-test knowledge score regarding cervical cancer and Pap smear testing will be higher than the pre-test score within participants in the intervention group.
- b. *Hypothesis:* Perceived cervical cancer susceptibility and perceived benefits of Pap smear testing scores will increase within participants in the intervention group from pre- to post-test.
- c. *Hypothesis:* Perceived cervical cancer severity and perceived barriers of Pap smear testing will change among participants in intervention group from pre- to post-test.

2. Material and methods:

Study design:

This study was a self –control intervention study.

The Subjects:

The study sample was women who were attended 4 MCH centers (Embaby center, Boutros health center, Cigar health center, and Cebabay center) of Tanta city.

The study was conducting from the first of October (2011) to end of January (2012) among women in the four MCH centers of Tanta city. Their ages ranged from 16 to 54 years, the study took 4 months from the initial pre –test to the post-test. The total sample included (125) women; thirty one (31) of them from the first MCH center (Embaby center), thirty four (34) women from the second one (Boutros health center), thirty women (30) from (Cigar health center) and thirty (30) women from (Cebabay center). The studied women were chosen for being women as well as for being a part of the corner stone of the community which in need for such education and knowledge.

Exclusive criteria:

Women, who their ages were < 16 years and who had done hysterectomy or who refused to complete the questionnaire, were excluded from the study.

Data collection:

A pilot study was conducted on (20) women initially to test the designed questionnaire to ensure that it is easily understood and could be answered and those women were excluded from the study sample.

I- Tools of study:-

To fulfill the purpose of this study it included three parts:-

Part 1: Socio-demographic characteristics of the women: This included two items as follows:-

(a) Personal data about women: such as age, level of education, marital status, work, income, and place of residence.

(b) Obstetrical data: such as gravidity, abortion, using contraceptive method, and number of children.

Part 2: Cervical cancer screen and vaccine assessment:-

This part was developed by the researchers to assess women's knowledge about cervical cancer, Pap smear, vaccination; it included three parts as follows:

(a) - Knowledge about cervical cancer, method of transmission, methods of prevention, complications of it and routine examination (13 questions).

(b) - Knowledge about Pap smear, what is the screening, type of screen, time of doing the screening, source of knowledge about screen, previous experience about Pap smear and family infection (6 questions).

(c) - Knowledge about vaccination, presence of vaccine, benefits of vaccine, availability of vaccine, suitable age for vaccination, who receive the vaccine, doses of vaccine, types of vaccine and the side effects of vaccine (8 questions).

Part 3: Perception of women toward cervical Cancer: -

This part of the tool assess women's perception toward cervical cancer and screening through using the Health Belief Model (HBM) that assumes people's beliefs about whether or not they are susceptible to disease, and their perceptions of the severity, benefits, barriers of trying to avoid it may influence their readiness to act. It included 4 parts (21 questions) as follows:

(a) - Perception the severity of disease (4 questions).

(b) - Perception the susceptibility of disease (4 questions).

(c) - Perception the benefit of doing Pap smears (3 questions).

(d) - Perception about barriers to Pap smears (10 questions).

II- Intervention with health education program:**-Objectives:**

Increase the awareness of women about cervical cancer, importance of the screening and the vaccination.

-Target: all the studied population (125) in all MCH centers in Tanta city.

- Setting: inside waiting room of MCH centers in Tanta city.

-Number and duration of the sessions:

It included 12 lectures from (one hour to one and half hour) on the average given in four weeks (3 lectures/week) for each MCH separately; the lectures were given for women before their asking needs.

Methods of teaching:

Lectures were used followed by free discussions with women.

Teaching aids:

Data show was used and posters. Brochure containing all the topics of the program was distributed among women. The topics were based upon recent WHO publication and references.

The content of the program included:

knowledge about cervical cancer, method of transmission, method of prevention, treatment, complications of it, routine examination, Pap smears knowledge, what is the screening, types, time and benefit of doing the screening, source of knowledge about screening, previous experience about Pap smear, family infection. Knowledge about vaccination, presence of the vaccine, benefit and availability of vaccine, suitable age for vaccination, who receive the vaccine, doses of vaccine, types of vaccine, side effects.

III-Post test stage:

The same questionnaire was answered by women at the end of the health education program (4 weeks period) for 4 centers separately to assess the changes in knowledge and perception of the studied sample.

Medical ethics:

Approval of the study was taken from administrators of Ministry of Health (MOH) in Mid-Delta governorates (AlGharbia) and MCH centers. A verbal approval was taken from each participant to share in the study. Confidentiality was assured.

The knowledge score:-

The knowledge questionnaire included 27 questions each question was given two points, the total scoring range from 0- 54. Questions were answered with don't know (0), know a little (1), know all (2). Women who achieved 60 % or more of the total score were considered to have satisfactory level of knowledge and who achieved < 60 % were considered to have unsatisfactory level of knowledge. This included (from 0-30% minimum, >30-≤60% median and > 60% maximum).

The perception score:

The perception questionnaire included 21 questions (score from 0-42). Questions were scored

either with disagree (0), agree (2), or uncertain (1). Those who scored $\geq 60\%$ were considered to have positive perception and those who had $< 60\%$ were considered to have negative perception.

Statistical analysis:

The obtained data were analyzed by SPSS software version 18. Descriptive statistics was used to calculate percentages and frequencies. The scores of the pre-post test questionnaires were summed regarding the knowledge and perception. Then the data was summarized in tables. Z-test was carried out to find significant difference between two proportions at the significant level of P less than 0.05.

3. Results

Table 1:- shows the socio- demographic characteristics of the studied sample. It shows that half of the women (50.4% & 53.7% respectively) were aged 26-35 years and lived in urban areas. The data also illustrates that about one third of the women 35.2% had secondary education while 19.2% were illiterate, the majority of women 96.8%, 88.0%, and 82.4% respectively were married, not working and had sufficient income.

Table 2:- illustrates the obstetrical data of the studied women, about two thirds of women (62.9%, 65.9 % respectively) had ≤ 2 gravida and had ≤ 2 children. The majority of them had ≤ 2 abortions and used contraceptive method (88.6% and 84.6% respectively).

Table 3:- shows the distribution of the studied women regarding their knowledge on cervical cancer. There was a significant improvement post intervention in all items of knowledge regarding cervical cancer (cancer cervix-Pap smear, vaccination, total knowledge of the women).

Table 4:- demonstrates the distribution of the studied women regarding their perception to cervical cancer. There was a significant improvement post intervention in all items regarding (seriousness, susceptibility of disease, benefits of early detection, vaccination, total perception towards cervical cancer) respectively, except the barriers which faced them.

Table 5:- shows the correlation of the studied women according to their knowledge about cervical cancer and socio demographic data pre-and post-intervention. It illustrates that women who had secondary education and also those could read and write had a good change in their knowledge pre and post intervention (18.0% and 18.0 %) respectively compared to women who had basic education or were illiterate, the difference was statistically significant. Moreover, women aged ≤ 35 years (36.0%) had a good change in their knowledge post intervention more than women aged ≤ 54 years (33.0%), with no

significant difference. Married and not working women had a good change in their knowledge post intervention (18.0%-18.0% respectively), the difference was not statistically significant. As regards women residence, there was no difference between women who lived in rural or urban areas in their improvement of knowledge and also those who had sufficient or insufficient income there is no change in their knowledge, the difference was not statistically significant.

Table 6:- shows the relation between women perception to cervical cancer and their socio-demographic data pre-and post-intervention. Women who had secondary education had a good change in their response toward cervical cancer pre and post intervention (2.10%) more than the other levels of education (illiterate 0.67%, read & write, 0.58% basic education 0.36%, university education 0.25%) the difference was not statistically significant. The table also indicates that married and not working women, living in urban areas and with sufficient income had a good change in their perception toward cervical cancer pre and post intervention (2.10%). The difference was not statistically significant.

Table (1):- Distribution of the studied women according to their socio-demographic characteristics.

Socio demographic data	No	%
Age in years		
• 16-25	36	28.8
• 26-35	63	50.4
• 36-45	15	12.0
• 46-54	11	8.8
Education		
• Illiterate	24	19.2
• Read & write	16	12.8
• Basic education	24	19.2
• Secondary education	44	35.2
• University	17	13.6
Marital status		
• Married	121	96.8
• Divorced	2	1.6
• Widowed	2	1.6
Work		
• Working	15	12.0
• Don't work	110	88.0
Income		
• Sufficient	103	82.4
• Insufficient	22	17.6
Residence		
• Urban	65	53.7
• Rural	56	46.3

Table 2:- Distribution of the studied women according their obstetric data

Obstetric data	No	%
Gravidity		
1-2	78	62.9
3-4	39	31.5
5+	7	5.6
Abortion		
1-2	31	88.6
3-4	4	1.4
Using contraceptive method		
• Yes	99	84.6
• No	18	15.4
Children No		
• No	1	0.8
• 1-2	81	65.9
• 3-4	35	28.5
• 5+	6	4.9

Table 3:- Distribution of the studied women regarding their knowledge on cervical cancer pre and post intervention

Knowledge items	Minimum	Maximum	Median	Z (P)
Cancer cervix knowledge				9.7 (0.000)*
• Pre intervention	0.0	10.0	0.0	
• Post intervention	0.0	13.0	10.0	
Pap smear knowledge				9.8 (0.000)*
• Pre intervention	0.0	2.0	0.0	
• Post intervention	0.0	3.0	2.0	
Vaccination knowledge				9.8 (0.000)*
• Pre intervention	0.0	3.0	0.0	
• Post intervention	3.0	8.0	5.0	
Total knowledge				9.6 (0.000)*
• Pre intervention	0.0	11.0	1.0	
• Post intervention	5.0	21.0	17.0	

Z: Wilcoxon test for two related samples * P < 0.05 (significant)

Table 4:- Distribution of the studied women regarding their perception to cervical cancer pre and post intervention

Response items	Minimum	Maximum	Median	Z (P)
Risk				6.6 (0.000)*
• Pre intervention	4.0	18.0	12.0	
• Post intervention	5.0	20.0	14.0	
Acceptance				7.1 (0.000)*
• Pre intervention	4.0	18.0	12.0	
• Post intervention	7.0	20.0	14.0	
Benefits				8.5 (0.000)*
• Pre intervention	3.0	15.0	9.0	
• Post intervention	6.0	15.0	14.0	
Barriers				1.2 (0.217)
• Pre intervention	10.0	44.0	30.0	
• Post intervention	13.0	50.0	30.0	
Total response				6.2 (0.000)*
• Pre intervention	21.0	89.0	64.0	
• Post intervention	53.0	105.0	72.0	

Z: Wilcoxon test for two related samples * P < 0.05 (significant)

Table 5:- Correlation of the studied women regarding their knowledge among cervical cancer and socio demographic data

Socio demographic data	Knowledge change			X ² (P)
	Minimum	Maximum	Median	
Age in years				2.3 (0.487)
• 16-25	-0.5	18.0	14.0	
• 26-35	1.4	18.0	11.0	
• 36-45	2.2	16.0	7.0	
• 46-54	0.8	17.0	9.1	12.2 (0.016)*
Education				
• Illiterate	2.2	17.0	5.0	
• Read & write	4.7	18.0	17.0	
• Basic education	0.8	16.0	8.0	
• Secondary education	-0.5	18.0	16.0	3.9 (0.137)
• University	4.7	17.0	7.5	
Marital status				
• Married	-0.5	18.0	14.0	3.9 (0.137)
• Divorced	2.3	2.3	2.3	
• Widowed	3.3	3.3	3.3	
Work				Z=1.8 (0.059)
• Working	-0.5	15.0	7.5	
• Don't work	0.8	18.0	14.0	Z= 1.2 (0.236)
Income				
• Sufficient	-0.5	18.0	8.3	Z=1.3 (0.195)
• Insufficient	3.3	18.0	15.0	
Residence				Z=1.3 (0.195)
• Urban	-0.5	18.0	7.8	
• Rural	0.8	18.0	14.5	

X²: Kruskal-Wallis test for several independent groups; Z: Mann-Whitney test for two independent groups; * P < 0.05 (significant)

Table 6:- Correlation of the studied women regarding their response change among cervical cancer and their socio demographic data

Socio demographic data	Response change			X ² (P)
	Minimum	Maximum	Median	
Age in years				1.9 (0.574)
• 16-25	-0.19	0.67	0.09	
• 26-35	-0.29	2.10	0.06	
• 36-45	-0.04	0.58	0.08	
• 46-54	-0.09	0.25	0.05	7.6 (0.107)
Education				
• Illiterate	-0.17	0.67	0.10	
• Read & write	-0.10	0.58	0.12	
• Basic education	-0.27	0.36	0.05	
• Secondary education	-0.29	2.10	0.09	4.4 (0.108)
• University	-0.12	0.25	0.03	
Marital status				
• Married	-0.29	2.10	0.08	4.4 (0.108)
• Divorced	-0.17	-0.03	-0.10	
• Widowed	-0.01	0.05	0.02	
Work				Z=1.4 (0.152)
• Working	-0.17	0.32	0.03	
• Don't work	-0.29	2.10	0.08	Z= 0.21 (0.831)
Income				
• Sufficient	-0.29	2.10	0.07	Z=0.33 (0.743)
• Insufficient	-0.08	0.58	0.10	
Residence				Z=0.33 (0.743)
• Urban	-0.22	2.10	0.07	
• Rural	-0.29	0.67	0.09	

X²: Kruskal-Wallis test for several independent groups; Z: Mann-Whitney test for two independent groups; P < 0.05 (significant)

4. Discussion:-

Cervical cancer is both a preventable and treatable disease. Vaccination against the human papillomavirus vaccines (HPV) has been shown to prevent cervical cancer and genital warts, and subsequently reduce the number of women requiring follow-up and treatment⁽¹⁹⁾. The purpose of this study was to generate knowledge and information policy through implementing an educational program on perceptions and knowledge among women in Tanta city.

The present study, a significant increase in knowledge on cancer cervix, Pap smear, vaccination and total knowledge were found among studied women post program implementation ($Z=9.7, 9.8, 9.8$, and 9.6 respectively $P=0.000$). Similar findings were reported regarding Pap smear (**Blake et al., 2004**, **Head et al., 2009**). On the other hand, **Tiro et al., (2007)**, documented an increased correlation between factors associated with HPV –cervical cancer knowledge familiarity with HPV does not necessarily guarantee accurate knowledge about its link to cervical cancer⁽²³⁾. The findings suggested that women's knowledge is likely to increase once she had an adverse consequence from an HPV infection. In the present study, it was observed that there was a significant difference in total knowledge between pre-program and after program surmised that educational efforts were appropriate for the target audience.

HPV vaccination has numerous public health benefits and holds remarkable promise for illustrating the cervical burden of illnesses related to HPV infection as demonstrated in previous studies^(19, 24). In the present study, the program resulted in statistically significant acceptance among women. According to the results^(24, 25) started that individual acceptance is dependent on a number of factors including personal beliefs about the vaccine, as well as perceptions of the beliefs of others such as partners and parents. **Gottvalel et al., (2009)**, in addition, **Khan et al., (2004)**, explored the attitudes about and intention to receive an HPV vaccine among young women. Their results associated knowledge with intention to receive the vaccine and suggested that perceived beliefs of people within once social network would significantly impact one's decision to be vaccinated. On the other hand, a study suggested that education and information designed to inform men about cervical cancer have an impact on their female partners willingness or ability to access services⁽²⁸⁾.

Moreira et al., (2006), reported that perception of risk was a strong predictor of vaccine acceptance. The benefits of the vaccine are factors associated with vaccine acceptability. One of the barriers to HPV vaccination is lack of knowledge about the

vaccine or target disease. This has been improved by the implemented program as a significant difference was observed in knowledge about the benefits of vaccination after the program. Our results emphasize the importance of informing women about the vaccine and its benefits. As regards residence, half of the studied women live in rural area. This is congruent with a study carried out in China, which showed that a significant proportion of the burden is observed in rural setting⁽²⁹⁾.

The present study showed a higher age group with target population than other studies. This discrepancy could be attributed to religious behavior in our country as sex is practiced within the marital form. This is contrary to the study carried out by **Yamkerm et al., (2010)**, who reported that 38.9 % of their participants had current sexual activity and they were classified as sexually experienced, and 48.8% of them had more than five sex partners in their life time. According to their findings, university students had poor knowledge about HPV and related disease which agrees, in part with our findings as they found significant increase in knowledge score between pre-test and post-test questions. On the contrary to our findings, **Villar et al., (2011)**, observed a higher general knowledge about HPV, as most of their health professionals recognized that HPV is sexually transmitted 98.7% , the Pap smear is a screening test 88.6% however, many of them didn't know that there is new vaccine available 38% and that many HPV vaccine are oncogenic 44.3%.

In the present study, the majority of the studied sample had sufficient income. This reflects the affordability of the HPV vaccine to cover privately as no financial assistance for the supply is provided in our country for specific initiatives such as vaccination programs. This is probably due to lack of awareness of HPV vaccination in preventing genital warts and subsequent cervical cancer. As regards the impact of education marital status and work, no statistically significant difference was found in relation to response to change, while a significant difference was found in relation to education and work. We could justify our findings by that education and working environment increase general knowledge and awareness on cancer in general especially among married women as sexual health constitutes a taboo in our culture. In agreement to our findings, knowledge, Pap smear test were not associated with demographic variables as reported by **Hoque et al., (2008)**.

Conclusion:-

The present study has raised lightened awareness on HPV infection and cancer cervix. There was a significant improvement post intervention in all items of knowledge regarding cervical cancer. There

was also a significant improvement post intervention in all items regarding perception except the barriers toward Pap smear screening which faced them. It founded the way to extend this program among all attendants of public gynecology clinics in MCH centers.

Recommendations:-

- There is urgent need to improve awareness as well as provide affordable cervical cancer screening services.
- It is important to raise awareness among population on HPV and its link to cervical cancer. Education on HPV vaccine should also include information about its safety and its benefit to prevent cervical cancer. Thus, public health campaign and patient education is required to increase the acceptance of the HPV vaccine among the population.
- HPV vaccination should be recommended before marriage for male and female.
- Flyers and pamphlets on PHV vaccination should be available in family planning clinics

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