Effect of an Educational Intervention based on Health Belief Model on Nurses' Knowledge Regarding Human Papillomavirus and Cervical Cancer

Marwa Reda Rashad [1], Amina Saad Gonied [2], Sabah Lotfy Mohamed [3], Mervat Mostafa Abd-El Monem Desoky [4]

[1]*Assistant lecturer of Obstetrics and Gynecological Nursing, Faculty of Nursing, Zagazig University, Egypt,*[2-3]*Professor of Obstetrics and Gynecological Nursing, Faculty of Nursing- Zagazig University, Egypt,* [4] *Assistant Professor of Obstetrics and Gynecological Nursing, Faculty of Nursing, Zagazig University, Egypt.*

Abstract

Human papillomavirus (HPV) is one of the most common sexually transmitted infections in the world and Cervical cancer is a significant health problem worldwide. It is the second most common cancer worldwide in women. Aim of the study was to evaluate the effect of an educational intervention based on health belief model on nurses' knowledge regarding human papillomavirus and cervical cancer. The study was quasi- experimental design. The study was conducted among nurses work in outpatient clinic and in the Gynecology Department at Zagazig University Hospitals. The study sample included all nurses who working at previous mentioned setting (25). Tool of data collection: Three tools were used: first: A structured interviewing questionnaire and the second tool: An observational checklist for nurses' practice and the third tool: Health Belief Model Scale (HBM scale). Results revealed that, there was statistically significant difference between total knowledge pre and post educational intervention of the studied nurses knowledge about HPV infection and cervical cancer (P=0,00). There was a significant improvement post intervention in all items of knowledge. and Mean of total knowledge in posttest after application of educational intervention was 17,3600 compared with mean of pretest was12,800. The study finding concluded that the majority of the studied nurses had poor knowledge regarding HPV, cervical cancer pre intervention and the majority had satisfactory, good knowledge respectively post intervention. So, the educational intervention based on HBM enhanced the nurses knowledge regarding cervical cancer prevention, significantly change positively health beliefs such as doing Pap test and receiving HPV vaccination. **Recommendation**: This study recommended that periodically screening for HPV and cervical cancer among women at reproductive age in the obstetric hospital and maternal–child health centers. Performing more studies to evaluate the effect of educational intervention on knowledge and practice toward cervical cancer screening among nurse.

Keywords: Cervical cancer, Educational intervention, Human papilloma virus, practice

1. Introduction

Human papillomavirus is one of the most common sexually transmitted infections in the world, which can also spread through vaginal, anal or oral sex with someone who is infected with the virus. Moreover, the possible non-sexual modes of transmission of HPV include, skin to skin contact and from infected mother to infant during birth [1].

Worldwide, an estimated 630 million persons are infected with human papilloma virus. The prevalence of HPV infections peaks in adolescence in both genders and increases every year from 14 to 24 years of age; it is estimated that approximately one-quarter of HPV infections are acquired by adolescents and the overall prevalence of HPV in Egypt was 10.4% and was highest (9.2%) amongst women aged 45–54 years [2].

Human papilloma viruses (HPV) are a small group of non – enveloped viruses belonging to the Papillomaviridae family with strong similarities to polyoma viruses. The viral particles consist of a genome in the form of a circular double-stranded DNA, encompassing eight open reading frames, as well as a non – enveloped icosahedral capsid. Human papilloma virus infection is considered the most common sexually transmitted disease in both sexes and is strongly implicated in the pathogenesis of different types of cancer [3]. These viruses are species specific and infect the basal epithelial cells of the skin and mucous membranes, causing different types of warts and a genital cancer. Human papillomavirus related neoplasms include cervical, vulvar, vaginal, penile, anal, rectal and oropharyngeal cancer. More than 80% of HPV-associated cancers affect the cervix, so most of the scientific evidence of vaccines is related to the cervical disease) [4]. Most of these infections are transient and asymptomatic. However, some HPV types of cause warts on the skin or around the genital area and several—in particular, HPV 16 and HPV 18, so-called high risk HPVs—can lead to high-grade lesions and eventually to HPV-associated cancers [5]. Human Papillomavirus vaccination is an effective approach for primary prevention of cervical cancer and presents an opportunity to reduce the burden from cervical cancer in a number of countries [6]. Cervical cancer is a significant health problem worldwide. It is the second most common cancer worldwide in women Although cervical cancer is acknowledged as a preventable disease, it is still the major health burden for women in many developing countries because in adequate screening programs Cervical cancer is a leading cause of death among women in the low and middle –income countries [7]. Nurses play essential and very important role in preventing HPV infection and cervical cancer because the nurses are responsible to provide health education and promotion services for both sexes to increase partner' knowledge, positively change the attitude and create awareness regarding HPV infection So, it is important to understand the knowledge regarding HPV infection and vaccination and its association with cervical cancer [8].

Significance of the study

Worldwide, Human papillomavirus (HPV) is the commonest viral sexually transmitted infection and the leading cause of cervical cancer [9]. Egypt has a population of 25.76 million women aged 15 years and older who are at risk of developing human papillomavirus infection and cervical cancer [10]. Nurses play essential and very important role in preventing HPV infection and cervical cancer by providing information, health education and promotion. So, it is necessary to improve nurses' knowledge regarding HPV infection and its vaccination so the current study will be conducted to evaluate the effect of an educational intervention based on health belief model on nurses' knowledge regarding human papillomavirus and cervical cancer.

1.1. Aim of the study

The present study aims to evaluate the effect of an educational intervention based on health belief model on nurses' knowledge regarding human papillomavirus and cervical cancer.

1.2. Research hypothesis:

Nurses' knowledge and practice regarding human papillomavirus and cervical cancer will improve after receiving an educational intervention based on health belief model.

2. Subjects and Methods
  1.1. Design: A quasi-experimental design with pre-post test was used to achieve the aim of the present study.
  1.2. Setting: The study was conducted in the outpatient clinic and in the gynecology department at Zagazig University Hospitals, Sharkia Governorate, Egypt.
  1.3. Subjects and sampling: The study sample A convenient sample was used in the study
  1.4. Sample size:
  1.5. All nurses who working at previous mentioned setting (25).
  1.6. Tool of data collection: The following three tools were used for data collection:

Tool I A structured interviewing questionnaire: was used that will be developed by the researcher based on relevant literature, aim of the study and the data needed to be collected. It was divided into two parts.

Part (I): Personal data of nurses included: Age, educational level, years of experience, previous training courses, and duration of courses)

Part (2): Assessment of nurses' knowledge regarding HPV and cervical cancer.it consisted of 4sections:

Section (1) was included knowledge related to cervical cancer, it consisted of (7) items.

Section (2) was included knowledge related to PAP smear test, it consisted of (4) items.

Section (3) was included knowledge related to human papilloma virus infection, it consisted of (8) items.

Section (4) was included knowledge related to HPV vaccine, it consisted of (9) items.

Scoring system for nurses' knowledge:

All knowledge variables were weighted according to items included in each question. Each item was given a score (2) when the answer was complete correct answer, a score (1) when the answer was incomplete correct and score (0) when the answer was I don't know. The total score of each section would be calculated by summation of its items the total score for the knowledge of each nurse was calculated by the addition of total scores of all sections. Nurses' total knowledge score was converted into total percent and was graded as the following

- Good: (≥ 75% correct answers).

- Average: (60 - < 75% correct answers).

- Poor: (<60% correct answer)

Tool II: Health Belief Model Scale (HBM scale): The HBM was adapted from (Annan, et al, 2019; Ampofo, et al, 2020) Modification was done by the researcher and under the guidance of supervisors it would be translated into Arabic language. It composed of 6 subscales (perceived susceptibility -seven items, perceived severity to cervical cancer –seven items, perceived barriers eleven items, perceived benefits -six items, cues to action -seven items,

self-efficacy -five items).

Scoring System of Health Belief Model: The questionnaire would be included (agree, sometimes, disagree) To obtain the outcome of HBM scale, each statement was scored as following: (2) if the response was "agree", (1) if it was —sometimes" and (Zero) if it was "disagree" in subscales of benefits, cues to action, self-efficacy. The score reversed to negative points in subscale of perceived barriers; each statement was scored as following: (2) if the response was "disagrees", (1) if it was "sometimes" and (Zero) if it was "agree". The total score would be expressed as a percentage. The total score of HBM would be classified into:

1.7. Pilot study:

After the development of the tools, a pilot study was carried out for 10% of nurses. These would not be included in the main study sample. The purposes of the pilot study would be to ascertain the relevance and content validity of the tools. Estimated the exact time needed for each session. Detected any problem peculiar to data collection tools that might face the researcher and interfere with data.

1.8. Field work:

After taken approval from the administrator of previous mentioned study setting. Data were collected for six months from the beginning of December2022to the end of May 2023. The researcher visits this setting 3 days / week at morning shift from 9:30 am to 12 pm. At beginning of the interview the researcher starts to introduce herself and explained briefly the aim of the study to the studied nurses to gain confidence and trust then took oral consent from them. The researcher interviewing with each nurse who fulfilled the sample criteria individually in waiting area at outpatient clinics. The average number of nurses interviewed per day were (2-3nurse /day). Using 2 tools to carry out the research were the first tool structured interviewing questionnaire which were used to assess nurses' sociodemographic data, previous, current obstetrical history and previous and current medical history within time range (8) minutes and nurses' knowledge regarding HPV, cervical cancer, PAP Smear and HPV vaccination, the second tool health belief model regarding humanpapillomavirus and cervical cancer filling within time range (10) minutes. The total duration of each interview was (average20 minutes and filled by the researcher). The researcher repeated the previous steps until finished the duration of data collection.

Nursing intervention:

The intervention was executed through the phases of assessment, planning, implementation, and evaluation.

I-Interviewing Phase & assessment phase: The researchers greeted nurses, introduced themselves, discussed the goal of the study, and gave the nurses all the details of the study, including its aim, duration, and activities, and obtained the nurse's verbal consent to participate in the study before the interview even began. The researcher gathered data by having each nurses complete the self-administered questionnaire, the Health Belief Model Scal, and the nurses's Knowledge regarding HPV and cervical cancer. Each nurse's interview took about the same amount of time to complete on average (25-30minutes). Every day, an average of (1-3) nurses were collected. In each groups of 1 to 2 nurses, they received three theoretical education sessions on human papilloma virus and cervical cancer, one session every two weeks (at the nurses 's admissions waiting room)

II-Planning Phase: The HPV and Cervical cancer teaching package was created using the outcomes of the assessment phase. The number of sessions, their content, the various teaching strategies, and the instructional media were chosen in accordance with the intervention group. The overall goal of the HPV, Cervical cancer educational package initiative was to increase nurses' essential knowledge of HPVand cervical cancer.

III-The intervention phase: The educational intervention was implemented over an eight-week period. Data were gathered three days. per week. The hospital nurses provided with booklet, and they also took part in the HPV educational intervention scheduled to them. Each session lasted around (15–20) minutes and was carried out in accordance with the date determined by the nurses during her break time. Nurses were introduced to the HPV, cervical cancer educational intervention contents at the start of the first session. At the conclusion of the session, each nurse was given information on the start time of the following one. The next session began with a review of the previous session and an explanation of the goals of the current session in simple Arabic to better fit the comprehension of the nurse audience. Nurses' queries were addressed to clear up any misunderstandings at the conclusion of each session. The first session, which started on the nurse's first visit after the interviewing phase, covered definition, risk factors, and how HPV affected body ,how to lead cervical cancer. The second session, which started during the nurse's second visit after the interviewing phase, focused on the impact of HPV, Cervical cancer. The third session began at the third visit after the interviewing process for the nurses, and it covered the importance of taking HPV vaccine in managing human papilloma virus which lead to cervical cancer. Each subgroup of (1-3) nurses received these sessions once more. Several instructional techniques were employed, including brainstorming, discussion, and initial and repeated demonstrations. All enrolled nurses in the study were given teaching materials, including videos and media, to help the study's goals be met. An Arabic booklet developed by the researchers using simple Arabic language to suit nurses' level of understanding that includes definition, risk factors and the effect of HPV, and cervical cancer, how to do pap smear and taking HPV vaccine.

Validity and reliability

Tools were reviewed by five experts in the field of Obstetrics and Gynecological Nursing to test its content validity. Modifications were done accordingly based on their judgment.

Reliability: Reliability was done by Cronbach's Alpha, the present study showed overall reliability of quality-of-life inventory (total) Alph Cronbach (.739good consistency).

2.9. Ethical Considerations:

The study proposal was approved by the Research Ethics Committee (REC), Faculty of nursing, Zagazig university, Egypt. Ethical code (11/2022). The nurses were informed that their involvement in this study is voluntary and they have the right to refuse or withdraw at any time of data collection as well as the confidentiality and anonymity of the collected data. They were also assured that any obtained information would be used only for research purposes.

2.10. Statistical design:

Data entry and statistical analysis were done using SPSS 20.0 statistical Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables. In order to identify the independent predictors of the scores of knowledge, attitude, awareness, and behavior, multiple linear regression analysis was used and analysis of variance for the full regression models was done. Statistical significance was considered at p-value <0.05.

3. Results and discussion

Considering the socio-demographic characteristics among the studied nurses, Table (1) shows that half of the studied nurses were aged 21-25 years old, majority of them had married, had technical institute education, sufficient income and all of them were technical nurses. The table also reveals that more than half of the studied nurses had 5-10 years of experience and the most majority of 96,0% nurses were from rural area. Table (2) shows the studied nurses' knowledge regarding HPV infection after implementation of educational intervention, there was a considerable improvement in some items of nurses' knowledge related to HPV infection with a highly statistically significant difference(p=0,000). As evidence (36,0% and 20,0%, respectively) of the studied nurses have correct knowledge about the definition of human papilloma virus infection. And whether HPV can infect (most vulnerable sex) pre implementing the educational intervention. while improved to (96,0% and 76,0%, respectively) after implementing the educational intervention program. Table 3 reveals the distribution incorrect knowledge percentage of the studied nurses regarding their knowledge about Pap Smear Test between pre and post-test before and after implementing the educational intervention as-meaning of Pap Smear test regarding was 80,0% which improved to 80,0% Recommended age of beginning Pap smear test (Time of beginning cervical cancer screening) was 60,0% improved to 44,0%. there was no statistically significant difference. Table 4 shows that, there is a marked improvement in all items of studied sample health belief model (total Perceived susceptibility, total Perceived severity, total perceived benefits, total Perceived barriers, total Cues to action and total Perceived self-efficacy) post intervention with a highly statistical significant difference (p=0.001). Table 5 clarifies that there was a positive statistical correlation between level of nurses' knowledge (pre, post) test about total HBM scores at pre and post intervention phases (r=0,119).
This figure 1 shows that the mean of total items of HBM was improved to 47,84 post intervention compared to 17,68 pre intervention

Discussion:

Worldwide, an estimated 630 million persons are infected with human papillomavirus (HPV) [1]. The prevalence of HPV infections peaks in adolescence in both genders and increases every year from 14 to 24 years of age; HPV infection has alarming proportions and is a predisposing factor for several types of cancers, including cervical, vaginal, anal and oropharyngeal cancer. Additionally, the development of highly effective HPV vaccines is an important breakthrough as it offers great potential to reduce the incidence of cervical cancer caused by HPV infection [2]. Therefore, this study aimed to o evaluate the effect of an educational intervention based on health belief model on nurses' knowledge and practice regarding human papillomavirus and cervical cancer. Regarding socio-demographic characteristics of the studied sample, the current study results revealed that half of the studied nurses were aged 21-25 years old. This result is consistent with the result of Tyseer et al. [3] who studied" Effect of a lecture-based education on female undergraduates' knowledge and acceptance of the human papillomavirus vaccine for cervical cancer prevention in Mansoura, and also is matched with Chang et al. [4] in their study about "Effect of an educational intervention on HPV knowledge and vaccine attitudes among urban employed women and female undergraduate students in China: a cross-sectional study", found that the mean age of the studied students was 20.4 ± 1.2 years. Increasingly, this finding is supported by Kwang et al. [5] who studied "Effect of an educational intervention on knowledge of human papillomavirus vaccination among pre-university students in Malaysia", revealed that the mean age of studied students was 18.0±0.20 years old, but Also this finding is not matched with Mutambara et al. [6] who concluded that the majority of participants were in the age range 30–39 and is inconsistent with Asmaa et al. [7] "Effect of Educational Program on Knowledge and Attitudes towards Cervical Cancer Screening among Women of Reproductive Age in Minia. This variation may be due to difference in sample size and sample criteria. Regarding educational level of nurses of the studied sample, this study revealed that majority were technical institute education and were technical nurses, this result of study isn't consistent with Mutambara et al.[6] who concluded that most of the participants were women with secondary education "Knowledge, attitudes, and practices of cervical cancer screening among women who attend traditional churches in Zimbabwe". And also, the current study findings were inconsistent with Eghbal et al.[8] who studied evaluating the effect of an educational program on increasing cervical cancer screening behavior among rural women in Guilan, Iran, and found that; the majority of the participants in the experimental group were illiterate or had elementary education.

Concerning the marital status of studied nurses, most of them were married. This finding is in agreement with Kwang et al. [5] who clarified that most of studied students were still single (99.8%) and also, this result is not matched with Monteiro et al. [2]. who conducted "Knowledge on the HPV vaccine among university students" journal of the SAO PAULA, institute of tropical medicine, indicated that approximately 95,0% were single. this clarified that human papilloma virus affect married and unmarried women.
On investigating knowledge of studied nurses sample regarding human papillomavirus infection and its vaccination, the results of present study illustrated that there is improvement in the level of all knowledge items regarding

human papilloma virus infection and its vaccination, where the minority and the majority of studied sample had poor knowledge regarding human papilloma virus infection and its vaccination at pre intervention and had good knowledge at post-intervention phases respectively. These results are observed as a highly statistical significant difference between the results of post-test compared to pre-test in favor of post-test regarding all items of nurses' knowledge regarding human papilloma virus infection. On investigating knowledge of studied nurses sample regarding, cervical cancer, cancer is increasingly becoming the disease of the century, especially cervical cancer that is now the fourth most common Gynecologic malignant tumor worldwide after breast cancer to cause death among the female population. This disease originates at the squamocolumnarjunction of cervical canal. It most commonly arises in an area known to undergo considerable changes during late fetal life, adolescence and first pregnancy Bray et al. [9]. this study clarified that the variations of the distribution correct knowledge percentage of the studied nurses regarding their knowledge about cervical cancer between pre and post-test before and after implementing the educational intervention as regarding definition of cervical cancer was 60,0% which improvedto 88,0%, Cervical cancer causative agent was 88,0% which improved to 100% respectively. Concerning the variations of the distribution incorrect knowledge percentage of the studied nurses regarding their knowledge about cervical cancer between pre and post-test before and after implementing the educational intervention as regarding cervical cancer and screening before and after implementing the educational program as regarding, Risk factors of cervical cancer was 76,0% improved to 60,0%. There are significant differences before and after implementing the educational intervention in items of knowledge, like (1- Definition of cervical cancer, 2-Cervical cancer causative agent is a4- Symptom(s) of cervical cancer. In this study, there is statistically significant difference between total knowledge pre and post application health educational program about cervical cancer of the studied nurses. (significant difference obtained at P = 0.01). Regarding total knowledge of the studied women regarding cervical cancer screening, the current study clarifies that most of the studied nurses haven't attended any educational program about cervical cancer. This study results are supported by the study done by Ahmed et al. [10] who studied health belief model-based educational program about cervical cancer prevention on women knowledge and beliefs and revealed that; all the women had poor knowledge scores about cervical cancer prevention before the program and improved to less than one quarter and the majority of the women having an average and good level of knowledge, respectively. This difference was significant (P=0.001).

Regarding the mean scores of constructs of HBM, the present study indicated that the study sample after the program got significantly increase scores regarding the perceived susceptibility, the perceived severity, the perceived barriers, the perceived benefits and the cues to action compared with the scores before the program. This table shows that, there is a marked improvement in all items of studied sample health belief model (total Perceived susceptibility, total Perceived severity, total perceived benefits, total Perceived barriers, total Cues to action and total Perceived self-efficacy) post intervention with a highly statistical significant difference (p<0.001) and shows that mean knowledge of nurses participated in the study (pretest) regarding total health belief model was 17,68 and mean knowledge of nurses participated in the study regarding total health belief model post intervention was 47,84. This might be because of the identification of the severity and benefits. Moreover, the nursing educational intervention might increase the awareness and motivation of the nurses. These study findings supported the study hypothesis number two that the nursing educational program based on HBM will change health beliefs positively toward cervical cancer prevention. Similar findings were obtained in a study carried out on students in Faculties of Benha University". Effect of self-learning package based on health belief model on cervical cancer prevention among female university students" who found that, after implementation of self-learning package, there was a significant improvement in all HBM constructs [11]. Moreover, these results are in agreement with a study carried out in Iran by Shojaeizadeh et al. [20]." The effect of educational program on increasing cervical cancer screening behavior among women in Hamadan, Iran: Applying Health Belief Model" who revealed that education based on HBM was effective and improved the perceived susceptibility, severity, benefits, and barriers [12]. The results of the current study indicated that there was a positive statistically significant correlation between total knowledge score and health belief Model constructs scores after the program. This might be because of nursing educational program, as it provided the participants with valuable information that can affect their health beliefs and preventive behaviors. These findings are in congruence with the study by Kang and Kim. [13] who pointed out that the increased knowledge was associated with increased total health beliefs and improved cervical cancer prevention behaviors. These findings are similar to the study done by Juntasopeepun et al. [14]. " Human papillomavirus vaccination intention among young women in Thailand "who reported that there was a significant positive correlation between total knowledge and total health beliefs scores. Moreover, these results are in agreement with the study by Kolz et al. [23]. Cervical cancer screening among immigrants and ethnic minorities: a systematic review using the Health Belief Model" who found that most participants provided responses that reflected a high level of knowledge about cervical cancer associated with increase in total health beliefs after intervention.

Part (I): Socio-demographic characteristics

Table (1): Distribution of the studied nurses according to their socio-demographic characteristics (n = 25).

| Variables		Number	Percent
1- Age /year	18-20	0	0%
	21-25	13	52%
	More than 25	12	48%
2- Marital Status	Single	2	8%
	married	22	88%
	Divorced	1	4%
3- Level of education	Technical institute education	20	80%
	University education	5	20%
4- Occupational Position	Technical nurse	20	80%
	Specialist nurse	3	12%
	Supervisor nurse	2	8%
5- Years of experience	< 5 years	9	36%
	5 - 10	15	60%
	11-15	1	4%
6- Income level	Sufficient	22	88%
	Insufficient	3	12%
7- Residence	Urban	1	4%
	Rural	24	96%
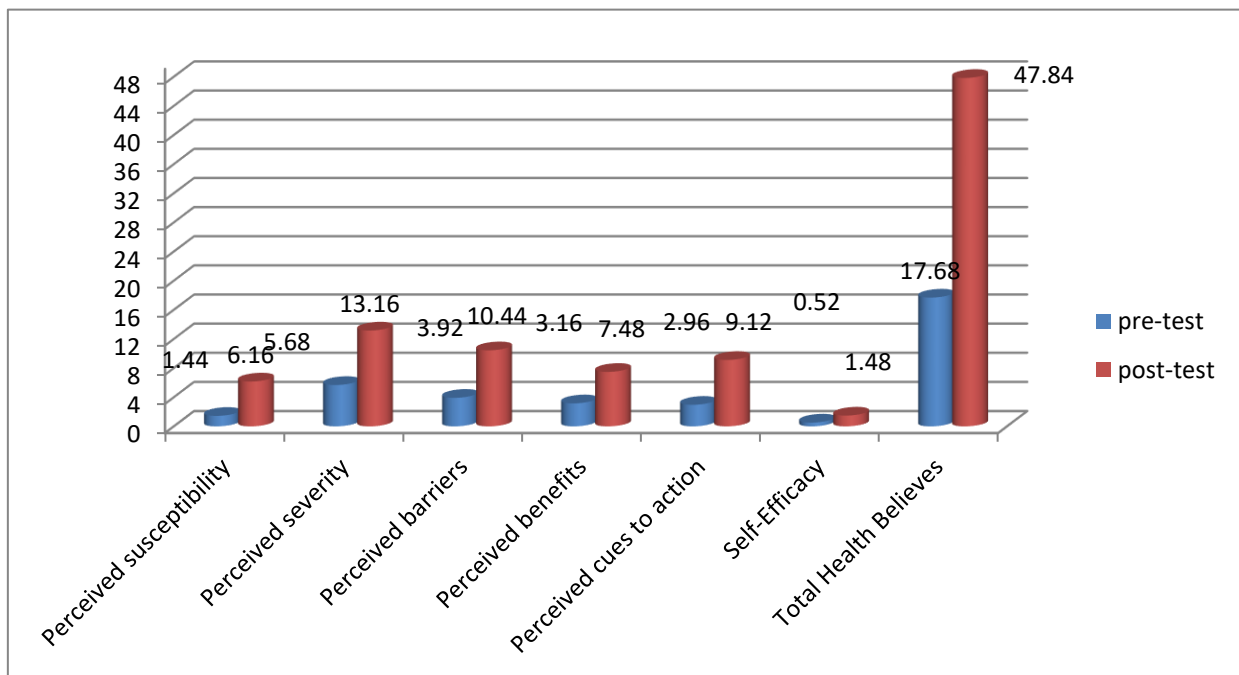
Figure 1: Means of the studied nurses regarding their knowledge about health belief model throughout the study phases (n = 25).

Part II: knowledge regarding HPV infection and Cervical cancer: Section (1): knowledge regarding HPV infection

Table (2): Distribution of the studied nurses according to their knowledge about HPV infection between pre and post-test (n = 25):

Question	Application	Incorrect no (%)	Correct no (%)	T-Test	P value
1- Definition of HPV	**Pre-test**	**16**	**9**		**0.000****
		64%	**36%**	**5.196**	
	Post test	**1**	**24**		
		4%	**96%**		
2- Human Papilloma Infection causative agent	**pre-test**	**4**	**21**		**.425**
		16%	**84%**	**0.811**	
	post-test	**2**	**23**		
		8%	**92%**		
3- HPV can infect (most vulnerable sex)	**pre-test**	**20**	**5**		**0.000****
		80%	**20%**	**5.527**	
	post-test	**6**	**19**		
		24%	**76%**		
4- Incubation period of HPV	**pre-test**	**24**	**1**		**0.327**
		96%	**4%**	**1.000**	
	post-test	**22**	**3**		
		88%	**12%**		
5- High risk HPV types	**pre-test**	**23**	**2**		**0.000****
		92%	**8%**	**7.141**	
	post-test	**2**	**23**		
		8%	**92%**		
6- Method of transmission of HPV infection	**pre-test**	**23**	**2**		**0.000****
		92%	**8%**	**5.527**	
	post-test	**2**	**23**		
		8%	**92%**		
7- Risk factors of HPV infection	**pre-test**	**25**	**0**		**0.083**
		100%	**0%**	**1.809**	
	post-test	**22**	**3**		
		88%	**12%**		
8- Symptom(s) of HPV infection	**pre-test**	**7**	**18**		**0.000****
		28%	**72%**	**4.096**	
	post-test	**18**	**7**		
		64%	**36%**		
9- Complication(s) of HPV infection	**pre-test**	**4**	**21**		**0.043***
		16%	**84%**	**2.138**	
	post-test	**0**	**25**		
		0%	**100%**		
10- Diagnosis of HPV infection	**pre-test**	**23**	**2**		**0.425**
		92%	**8%**	**0.811**	
	post-test	**21**	**4**		
		84%	**16%**		
11- Method(s) of prevention of HPV infection	**pre-test**	**9**	**16**		**0.256**
		36%	**64%**	**1.163**	
	post-test	**5**	**20**		
		20%	**80%**		
12- Treatment of HPV infection	**pre-test**	**24**	**1**		**0.161**
		96%	**4%**	**1.445**	
	post-test	**22**	**3**		
		88%	**12%**		

Section (2): knowledge regarding Pap Smear Test:

Table (3): Distribution of the studied nurses according to their knowledge about Pap Smear Test between pre and post-test (n = 25).

Question	Application	Incorrect no (%)	Correct no (%)	T-Test	P value
1-Meaning of Pap Smear test	**pre-test**	20 80%	5 20%	0.000	1.000
	post-test	20 80%	5 20%		
2-Recommended age of beginning Pap smear test (Time of beginning cervical cancer screening)	**pre-test**	15 60%	10 40%	1.072	0.294
	post-test	11 44%	14 56%		
3-Frequency of Pap smear/year	**pre-test**	7 28%	18 72%	0.296	0.770
	post-test	8 32%	17 68%		
4-Cessation of pap smear test in	**pre-test**	8 32%	17 68%	0.492	0.627
	post-test	10 40%	15 60%		

Table (4): Correlation among nurses' (pre, post) knowledge about HPV infection and Cervical cancer

	r	P value
Pre & Post knowledge regarding HPV infection	0.084	0.688
Pre & Post knowledge regarding HPV Vaccine	0.191	0.361
Pre & Post knowledge regarding cervical cancer	0.035	0.866
Pre & Post knowledge regarding Pap Smear Test	-0.397	0.050*
Pre & Post Total knowledge	0.137	0.514

**. significant at the 0.01 level (2-tailed).   *. significant at the 0.05 level

Table (5): Correlation among level of nurses' (pre, post) knowledge about Health Belief Model.

Health Believes	r	P value
Pre & Post Perceived susceptibility	**0.003**	**0.988**
Pre & Post Perceived severity	**0.135**	**0.521**
Pre & Post Perceived barriers	**0.112**	**0.595**
Pre & Post Perceived benefits	**0.217**	**0.298**
Pre & Post Perceived cues to action	**-0.021**	**0.921**
Pre & Post Self-Efficacy	**-0.173**	**0.408**
Pre & Post Total Health Believes	**0.119**	**0.571**

significant at the 0.01 level (2-tailed).   *. significant at the 0.05 level

Finally, these results emphasize the need to enhance health educational intervention to improve nurses' knowledge about HVP infection in age group partially at gynecological outpatient clinics as well as enhance early recognition of HVP infection to take necessary precautions in protecting from it and encourage women to seek medical advice and take prescribed treatment and vaccine. Finally, the present study findings highlight attention toward the effectiveness and practicability of the implemented educational intervention to nurses as a method for continuous updating and improved their knowledge and practice to promote and improve their competences.

4. Conclusions

Based on the findings of the present study, it can be concluded that before implementing the educational intervention, most of the studied nurses had poor knowledge regarding HPV, cervical cancer and the majority had satisfactory and good knowledge, respectively, after implementation.

Recommendation

Based on the present study's findings the following are recommended:

- Periodically screening for HPV and cervical cancer among women at reproductive age in the obstetric hospital and maternal–child health centers.

- Performing more studies to evaluate the effect of educational intervention on knowledge and practice toward cervical cancer screening among nurses.

- Conducting similar studies on females before reproductive period (12 to less than 19 years) can be more preventive.

- Distribution of booklet for all university students to improve their awareness regarding importance of HPV vaccination.

- HPV vaccination should be recommended for each female before marriage.

- The barriers to Pap smear test are considered by the health authorities in order to overcome barriers of cervical cancer screening

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