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Research Article

Enhancing the Knowledge of Cervical Cancer Screening among Female Nursing Students: An Interventional Educational Program

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Abstract

Background: Cervical cancer is a growing health risk facing women worldwide with the human papillomavirus (HPV) as the primary underlying cause. Pap smear is a simple screening test that can detect early changes in cervical cells, which might develop into cancer cells. Raising awareness of cervical cancer prevention has a significant impact on decreasing the burden of the disease. The aim of the study is to assess female nursing students' knowledge on early detection and screening of cervical cancer, and to determine the effectiveness of an educational program.

Methods: A quasi-experimental research design (one group for pre- and post-tests) was utilized with a convenience sample of 130 female nursing students in one of the nursing colleges in Saudi Arabia. The study's educational intervention included information about anatomy of genital tract and the importance of regular check-ups. The pre- and post-tests were applied to identify changes after intervention measures.

Results: The mean age of the participants were 21.32 years (SD: 1.34). The findings revealed a significant improvement of post-test students' knowledge in all items related to risk factors, signs and symptoms, occurrence, identification of HPV as causative agent, vaccination against HPV, and finally Pap smear for early detection and screening of cervical cancer.

Conclusion: The study results support implementing educational intervention to improve nursing students' knowledge and awareness about cervical cancer prevention. Furthermore, it is imperative that cervical cancer awareness education modules should be developed and integrated within the nursing curriculum. Further studies with large sample size are recommended to increase generalization of the results.

Keywords: cervical cancer, education program, primary prevention, nursing students, Saudi Arabia

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1. Introduction

Cervical cancer is one of the diseases that could be avoided by encouraging people who are at risk to have a regular screening. Increasing people's awareness about the importance of disease screening may encourage them to be actively engaged in disease prevention initiatives. According to the World Health Organization (WHO), cervical cancer is the fourth most common cancer among women, with an estimated 570,000 new cases representing 6.6% of all female cancers around the world in 2018. Death from cervical cancer in low- and middle-income countries is about 90% [1]. Factors increasing death in developing countries include lack of awareness and high vaccine costs [2].

From Saudi Arabian context, cervical cancer is not a major contributor to women's health problems in the country. More than 90% of cervical cancer cases are related to human papillomavirus (HPV) infection [3]. The pathogenesis can develop through precancerous lesions to invasive cancer over a period of 10–20 years and ultimately lead to death [4]. Cancer of the cervix is preventable and can be easily managed if identified at early stages through Pap smear [5]. Unfortunately, about 90% of deaths did not have regular Pap smear. A recent report mentioned that about 316 new cases of cervical cancer were diagnosed annually in Saudi Arabia. Cervical cancer is the ninth most common cancer among females aged 15–44 years [6]. Henceforth, studies exploring cervical cancer educational interventions are warranted [7].

Effective health education programs targeting cervical cancer awareness need sophisticated and comprehensive planning and needs assessment of the target groups such as the level of knowledge, beliefs, attitudes, and behavior [8, 9]. Comprehensive health education programs are more likely to promote screening, so it is important for health providers including nursing students to provide information about risk factors, early signs of cervical cancer, and encourage women to screen for cervical cancer on a regular basis [3, 10].

Raising awareness of cervical cancer prevention has a significant impact on decreasing the burden of the disease. Specifically, evidence has shown that education interventions to raise awareness improve accessibility to services, increase individuals' efficacy, and inspire future choices, which in turn enhance the efficiency of preventive health services [11]. The aim of this study was to assess and enhance female nursing students' knowledge and early detection and screening of cervical cancer utilizing an education program as an intervention. The study hypothesis assumes that educational programs will raise the knowledge and awareness of nursing students about cervical cancer, screening, and early detection.

2. Methods

A quasi-experimental design (pre-test–post-test design) was utilized to explore a convenient sample of 130 female nursing students the Nursing College at Taibah University in Saudi Arabia. The study included students who were 18 years or older. Those who

were younger than 18 years were excluded. Potential candidates were approached and invited to participate in the study.

2.1. Instrument

The study instrument consisted of two sections: the first section consisted of the sociodemographic data including age, education level, age of menarche, family history, smoking, and attending an educational session about cervical cancer; while the second section was the pre–post intervention test. As academics, the researchers constructed this section of simple questions recalling knowledge about the importance of genital tract check-ups, diseases that affect the genital tract, definition of cervical cancer, causes and screening, vaccination, HPV, Pap smear definition, importance of test, and the use, technique, periodicity, and precautions before having a Pap smear. This section tested for content validity by five academic nursing experts. Modifications were made according to the experts' assessment. Although the instrument was administered to the same population for more than one session under similar conditions, a pilot study involving 13 participants were undertaken. The final version of the instrument was attained following the pilot study outcome.

Further, the scoring system was adapted from a previous study [12]. In detail, the scoring system classified participants' answers into three categories (wrong answer = 0, incomplete answer = 1, and complete answer = 3). The student with a score below 50% was considered to have poor knowledge. The overall score was classified as follows: low = <50%; accepted knowledge level = 50–75%; and good knowledge = >75%. Data were analyzed using the Statistical Package for Social Sciences software package (SPSS Inc., Chicago, IL, USA) version 20.0. Frequencies, percentages, mean, and median were calculated for the knowledge score. Student *t*-test and Chi-square test were utilized to analyze the results. Statistical significance was identified at $P < 0.05$.

2.2. Procedure

The aim of the study was explained to the participants followed by assessing the pre-test knowledge level (estimated time 10–13 min). The intervention was an educational session delivered for 120 min including the following:

1. Anatomy of genital tract and importance of genital tract screening
2. Cervical cancer definition, risk factors, causes, signs, and symptoms
3. The relation between sexual activity and cervical cancer
4. HPV, its vaccine, screening of cervical cancer, pap smear technique, timing, periodicity, and precautions before Pap smear

The researchers used audio–visual aid such as Microsoft PowerPoint presentation, videos, and pictures for explanations. The final stage of post-test followed the education intervention (estimated time 10–13 min).

3. Results

The mean age of the study participants was 21.32 years (SD = 1.34), while the mean age of menarche was 12.93 years (SD = 1.39). Other sociodemographic characteristics (Table 1) showed that 90% of study samples were not married. Neither of the participants smoked nor had a family history of cervical cancer. The majority knew about cervical cancer but did not attend any educational session in this regard. Sources of information about cervical cancer were TV, social media, friends, academic study, and reading newspapers (16.1%, 63.1%, 2.3%, 2.3%, and 16.2%, respectively).

Table 1: Sociodemographic characteristics (n = 130).

Characteristics	No.	%
Marital status		
Single	117	90.0
Married	13	10.0
Smoking status		
Yes	0	0
No	130	100.0
Cervical cancer family history		
Yes	0	0
No	130	100.0
Attended previous educational activity		
Yes	01	0.80
No	129	99.2
Prior knowledge of cervical cancer		
Yes	99	76.2
No	31	23.8
Preferred source of information		
TV	21	16.1
Social media	82	63.1
Friends	03	02.3
Academic study	03	02.3
Newspapers	21	16.2

As shown in Table 2, high statistically significant improvements were observed in the results of the post-test knowledge of students in the sample regarding the importance of check-up of genital tract, diseases that affect the cervix, risk factors, signs and symptoms of cervical cancer, and the relationship between sexual activity and cervical cancer when compared with the pre-test results, at $P < 0.001$. It is evident that the complete and correct answers were 22.3%, 27.7%, 6.9%, 3.1%, 2.3%, and 42.3%, respectively in pre-test, while at the post-test, the percentage of complete and correct responses rose, respectively, to 79.2% ,89.2%, 88.5%, 90.0%, and 96.9%. Regarding the students' knowledge about causative organism of cervical cancer (HPV) and its vaccination, there

Table 2: Comparison of the results of pre–post knowledge tests related to cervical cancer, HPV (*n* = 130).

Knowledge statements	Answer	Group test				X^2	P-value
		Pre		Post			
The importance of check-up of genital tract?	Complete	29	22.3%	103	79.2%	94.8	0.001**
	Incomplete	83	63.8%	12	9.2%		
	Wrong	18	13.8%	15	11.5%		
Diseases affecting the cervix	Complete	36	27.7%	116	89.2%	101.5	0.001**
	Incomplete	56	43.1%	7	5.4%		
	Wrong	38	29.2%	7	5.4%		
Knowledge about cervical cancer	Complete	9	06.9%	115	88.5%	176.9	0.001**
	Incomplete	63	48.5%	14	10.8%		
	Wrong	58	44.6%	1	0.8%		
Cervical cancer risk factors	Complete	04	03.1%	115	88.5%	200.1	0.000
	Incomplete	43	33.1%	15	11.5%		
	Wrong	83	63.8%	0	0.0%		
Signs and symptoms of cervical cancer	Complete	3	2.3%	117	90.0%	210.7	0.000
	Incomplete	34	26.2%	13	10.0%		
	Wrong	93	71.5%	0	0.0%		
Relationship between sexual activity and cervical cancer	Yes	55	42.3%	126	96.9%	91.7	0.000
	No	75	57.7%	4	3.1%		
Knowledge about HPV	Complete	16	12.3%	126	96.9%	188.6	0.000
	Incomplete	11	8.5%	2	1.5%		
	Wrong	103	79.2%	2	1.5%		
HPV vaccine	Complete	4	3.1%	122	93.8%	218.5	0.000
	Incomplete	26	20.0%	7	5.4%		
	Wrong	100	76.9%	1	0.8%		

was a high statistically significant improvement in post-test results as compared to pre-test, the complete and correct answers were 96.9%, 93.8% in post-test compared to 12.3% and 3.1% in pre-test at *P*-value = 0.000.

Table 3 shows the comparison of pre- and post-tests knowledge assessment of female students regarding Pap smear definition, associated pain, timing, periodicity, and prior precautions, and statistically significant improvements were observed in all these items, *P* = 0.000. At the pre-test, the majority of the students had incorrect and wrong answers but this result was reversed to complete and correct at post-test.

Table 3: Pre–post knowledge of the students regarding Pap smear (screening of cervical cancer) (*n* =130).

Answers		Group				X^2	P-value
		Pre		Post			
Do you know what a Papanicolaou/Pap smear is?	Yes	5	3.8%	125	96.2%	221.5	0.000
	No	125	96.2%	5	3.8%		
Knowledge about Pap smear	Complete	7	5.4%	110	84.6%	181.1	0.000
	Incomplete	19	14.6%	15	11.5%		
	Wrong	104	80.0%	5	3.8%		
Is there pain during Pap smear?	Yes	94	72.3%	119	91.5%	23.8	0.000
	No	36	27.7%	11	8.5%		
Recommended age and frequency for performing of Pap smear	Complete	3	2.3%	123	94.6%	222.7	0.000
	Incomplete	27	20.8%	4	3.1%		
	Wrong	100	76.9%	3	2.3%		
Precautions before performing Pap smear	Complete	2	1.5%	117	90.0%	222.1	0.000
	Incomplete	11	8.5%	11	8.5%		
	Wrong	117	90.0%	2	1.5%		

Table 4: Comparison of total pre–post knowledge test among student in the study sample (*n* = 130).

Knowledge	Assessment				Statistical test	P-value
	Pre		Post			
	No.	%	No.	%		
Poor (<50)	126	96.9%	1	0.8%	X^2 = 242.8	0.001**
Fair (50–<75%)	4	3.1%	23	17.7%		
Good (75%+)	0	0.0%	106	81.5%		
Range	1–14		11–22		*t* = 46.8	0.001**
Mean (SD)	6.44 (2.7)		19.9 (1.9)			

The results of pre–post total knowledge scores of female students in the study sample are presented in Table 4. It indicates statistically significant improvement in the total students' knowledge scores in the post-test compared to the pre-test, *P* = 0.001. As seen in the table, the great majority of students (96.9%) had poor knowledge pre-test, which was greatly improved post-test, where 81.5% had good knowledge.

4. Discussion

Working on preventing cervical cancer through screening is a valuable strategy to combat the increasing rate of the disease. Despite the provision of medical services

and availability of screening tests, increasing people's risk awareness and supporting them to be actively engaged in disease prevention could be the best approach to increase screening rate. The current study showed that the majority of the participants despite having a prior knowledge of cervical cancer had not attended any educational programs. While social media was the main source of cervical cancer information, TV and newspapers were the second. These results are in line with a previous study conducted in Egypt that found 95.1% of the participant nurses did not attend any program about cervical cancer, but about two-third of them took their information from work experience followed by academic study and doctors [13]. In addition, similar results were found in India where 20% of the participants identified that reading newspapers is their source of cervical cancer information [10].

The finding of the present study supports previous studies where a significant improvement of post-test students' knowledge in all items of cervical cancer has been reported, which supports the implementation of educational programs especially in mass gathering locations such as universities and schools [13]. Educational programs were a crucial factor in applying cervical cancer awareness campaigns [14]. Furthermore, these programs enhance women's health beliefs, thereby helping in cervical cancer prevention and detection [3, 15].

According to the American Cancer Association guideline, Pap smear and the HPV DNA test are significant diagnostic tools [16]. Improvement in participants' awareness about HPV and its vaccine was evident taking into account the difference in the scores of the pre- and post-tests. Similar trend was found in previous studies conducted outside Saudi Arabia [17]. At pre-test, majority of the participants had poor knowledge about Pap smear, importance, procedures, timing, periodicity, and prior precautions. However, the post-test showed great improvement in the students' knowledge regarding all of these items. In the same line of findings, previous studies of similar intervention made significant positive enhancement in participants' knowledge noticing the difference between the pre- and post-tests [18].

In general, the study supports the findings of previous international studies proving overall cervical cancer knowledge improvements [9, 11, 13]. Therefore, it is imperative to recommend educational programs to attain cervical cancer awareness among target groups [1].

The study results recommend further similar initiatives within the university to raise the general awareness of all students. Furthermore, enhanced educational programs for cervical cancer awareness should be included in the nursing curriculum. From a community stand, community campaigns are warranted to raise public awareness on cervical cancer and Pap smear screening become a routine test for all women in childbearing age.

5. Conclusion

In this study, the majority of the participants had poor knowledge about cervical cancer pre-test. After delivering the educational intervention, the post-test indicated significant improvements in the participants' level of knowledge for almost all items. Therefore,

the study results conclude that educational interventions about cervical cancer were successful in increasing awareness and knowledge among the study participants.

Acknowledgments

None.

Ethical Considerations

The college of nursing research ethics committee (REC-TUCN) approved the study proposal. Potential participants received an invitation including explanation of the study aim and procedures. Study data were treated confidentially and not utilized for academic purposes.

Competing Interests

None.

Availability of Data and Material

The data used in this study is available upon reasonable request.

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