

Effect of Tele-nursing Instructions on Women Knowledge and Beliefs about Cervical Cancer Prevention

Tahany El-Sayed El-Sayed Amr¹, Reda Mohamed Elsayed Ramadan², Asmaa Ghareeb Mohamed³ & Reda M.Nabil Aboushady⁴

¹. Assistant Professor of Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University, Egypt- College of Applied Medical Sciences, Shaqra University, KSA

². Medical Surgical Nursing, Faculty of Nursing, Ain Shams University, Egypt

³. Assistant professor of community Health Nursing, Faculty of Nursing, Assiut University, Egypt.

⁴. Maternal and Newborn Health Nursing, Cairo University, Egypt.

Abstract

Worldwide, the cervical cancer considered the most frequent gynecological cancer among women. Effective primary and secondary prevention approaches will prevent most cervical cancer cases. **Aim of the study:** is to assess the level of women's knowledge and beliefs regarding cervical cancer prevention and to implement and examine the effectiveness of tele-nursing instructions on women based on Health Belief Model. **Methods:** A quasi-experimental design was used. This study was conducted at primary health care center and outpatient clinic at Shaqra city, KSA. A convenience sample of 75 women were enrolled in the study. Three tools were used to collect data, 1) structured interviewing questionnaire, 2) structured cervical cancer knowledge questionnaire & 3) Health Belief Model Scale **Results:** There was a statistically significant difference regarding level of knowledge after applying Tele- nursing based on Health Belief Model. In addition, there was a statistical difference regarding sub-scale of health belief model and increasing in mean percentage after intervention among study sample. **Conclusion:** Tele- nursing education through the application of the Health Belief Model proved massive changes in improving both the beliefs of the participating women, as well as the level of their knowledge about cervical cancer prevention. **Recommendation:** Enhancement of tele-nursing instruction use in many nursing practice settings and developing future research prevention programs that cover a large sample would be of a great importance in early detection and management.

Keywords: *Cervical cancer, Knowledge, Health Belief Model & Tele-nursing.*

Introduction:

The cervix cancer had categorized as 4th most public female cancer among females worldwide (Ferlay, et al. 2015). It had enormously a huge effect on the lower resources' nations; where about 90% of the cervical cancer-related deaths can be happened in these countries (Castle and Pierz, 2019; Arbyn et al., 2020, & Alreshidi, et al., 2020). About 528,000 per year is the number of cervical cancer cases in the world. It is also measured to be the second most common cancers in developing countries (Aldohain et al., 2019). High death rate of cervical cancer in developing countries is due to many causes; only 5% of spending on cervical prevention programs was paid by developed countries globally (Ferdous et al., 2016).

Cancer of the cervix positions as 9th women cancer in the Gulf Arab States. The highest occurrence was in Oman (58%) and the lowest in the United Arab Emirates (10%) (Alkhalawi et al., 2019). It is categorizing a twelfth of all females'cancers accounting for 2.4% of all new cases of cancer In Saudi Arabia (Alsbeih, 2014). In 2014, new cases incidence of cervical cancer was 1.9 per 100,000 (Al-Zahrani, 2014). A recent study by (Al-Mandeel, et

al., 2016) had certain that, cervical cancer became the third most public gynecological malignancy in Saudi women. However, in Saudi Arabia near to 40 % of women diagnosed with this problem at late stages. Lack of effective prevention and screening programs in Saudi Arabia lead to delayed in detection of the disease in early stage.

Human papillomavirus (HPV) types are the main cause in activating the growth of cervical cancer (Arbyn, et al., 2020 & WHO, 2018). HPV is a sexually transmitted infection (Alnafisah, et al., 2019). Furthermore, other factors associated with this cancer as genetic predisposition, smoking, compromised immunity, early sexual debut, multiple sexual partners, and lack of disease awareness (Kumar et al., 2007 & Urasa et al., 2011). A huge financial and social burden is related to this problem. It is a social disease, especially for the poor and the less educated, which are at risk factors (Amotsuka, 2013).

Firstly, there were neither signs nor symptoms in women with initial cervical cancer and precancerous lesions. When metastases start to occur, the most common symptoms include abnormal vaginal

bleeding after sex, douching, menopause, bleeding and spotting between periods, heavy or long menstrual period than usual; pain during sex and abnormal vaginal discharge. Further with advanced cervical cancer women can suffer from pelvic pain, loss of appetite, weight loss, and decrease in red platelets (Bodurka et al., 2011). It was evidenced that, providing regular cervical screening services to all women who have been sexually active, doing HPV test, Pap smears or the Visual Inspection of the Acetic Acid painted cervix (VIA), and vaccination against the HPV before the beginning of sexual activity were effective in prevention this disease (Obstetricians, 2003).

Tele-nursing is a component of tele-health that occurs when staff nurses meet the health needs of patients using information, communication and web-based systems. This has been defined as the delivery, management and coordination of care, and services provided through information and telecommunication technologies (Schlachta, 2015). This technology helps to rapid access of better services, decrease cost and facilitate easy access to the most appropriate specialized skills and increase the quality of the provision of health services to patients. (Massarat et al., 2011). Furthermore, through tele-nursing training and remote consultation for patients can be provided by email for patients and their relatives. (McGonigle & Mastrian, 2008)

Tele-health is defined as “the use of electronic information and telecommunication technologies to support and promote long-distance clinical healthcare, patient and professional health-related education, public health and health administration” (Health & Human Services Department, 2020). Tele-nursing is a subcategory of tele-health which concerned on the transfer, management, and coordination of care and administrations utilizing using telecommunications technology innovation inside the nursing field (Dunk et al., 2004). Nowadays, telephone is an accessible communication method used for telenursing. It has several uses in our society to helps access of care services, and improves the relationship between patients & caregivers (Zakeri et al., 2009).

The Health Belief Model (HBM) focuses on a person's healthy behavior to predict future actions (Yakout et al., 2016). It is an appropriate needs assessment model that is very useful for health developers to plan intervention practices (Ogden, 2009). According to the HBM, to accept preventive measures, a person must see the risk of the problem, understand the complexity of the complications, and in case of the positive evaluation of the benefits a preventive behavior will be adopted (Shojaeezadeh et

al., 2011). Furthermore, the choice to participate in prevention programs controlled by many factors as perceived susceptibility to the health condition, perceived severity, perceived benefits of undertaking screening, perceived barriers and budgets of the screening approaches (Abolfotouh, 2015).

Both primary and secondary levels of prevention can make cervical cancer occurrence and death largely avoidable when implemented (Arbyn, et al., 2020). So, nurses have an important mission to convey information about risk factors, early signs detection of cervical cancer and women encouragement for regular cervical cancer screening. This can be achieved by conducting additional educational programs for nurses who is considered a vital cog in the healthcare delivery system (Naik et al., 2012; & Mali, 2014). Several studies assured that, effective female education on cervical cancer and screening was recognized, among other strategies, as a way to increase awareness about cancer screening services (Nwankwo et al., 2011; Oche et al., 2013 & Anyebe et al., 2014). Therefore, the current study contributes to assess, implement and examine the effectiveness of tele-nursing instruction on the women level of knowledge and beliefs towards cervical cancer prevention based on HBM. Therefore, the current study aimed to assess women knowledge level and evaluate the effectiveness of Tele-nursing instruction on women level of knowledge and beliefs based on HBM.

Significance of the study:

Cervical cancer is a preventable and curable disease if early diagnosed. Tele-nursing raises patients' access to an influencer and effective nursing (Zakeri et al., 2009). Studies have shown that mobile health applications may be a useful tool to facilitate improvement of communication between patients and health care providers (Becker et al., 2014, Whitehead & Seaton, 2016). Many factors contributes to cervical cancer occurrence such as lack of screening programs, limited access to care, certain behavioral factors, values and beliefs. (Richardson et al., 2011). Thus, application of HBM is used widely to assess the health beliefs on the screening behaviors, aids to forecast behavior, and health promotion activities (McEwen & Wills, 2014).

Aim of the study:

The current study aimed to:

- 1- Assess women knowledge level regarding cervical cancer prevention after Tele-nursing instruction implementation.
- 2- Implement and evaluate the effectiveness of Tele-nursing instruction on women's level of knowledge and beliefs based on Health Belief Model.

Research Hypothesis

Women who will receive the Tele-nursing instruction about cervical cancer prevention; their knowledge and belief were affected positively.

Subjects & Methods

Study design

The quasi-experimental design was adopted to carry out this study.

Setting

The study was carried out at primary health care center and outpatient clinic at Shaqra hospital, Shaqra city, Riyadh, Kingdom of Saudi Arabia (KSA) which provides secondary and tertiary level of service such as (Medical, Gynecological examination & treatment).

Sample:

A convenient sample of 75 women were recruited after their acceptance to share in the study. The women were enrolled based on the inclusion and exclusion criteria. Inclusion criteria includes: married women, did not receive any nursing education before regarding cervical cancer prevention. Exclusion criteria includes: Women had learning disabilities, undergoing psychiatric treatment.

Sample size: A total of (75) women were selected according to the following statistical formula $n = Z^2p(1-p)/d^2$, where z = level of confidence according to the standard normal distribution (for a level of confidence of 95%, $z = 1.96$). p = estimated proportion of the population that presents the characteristic (when unknown we use $p = 0.5$), d = (d is considered 0.05).

Data collection tools

Four tools were used to collect data.

Tool I: Structured interviewing questionnaire: it was developed by researchers and consisted of two parts. Part (1): Includes demographic data such as age, educational level, occupation, etc. Part (2): Includes family and obstetric history (e.g. family history of cervical cancer, age at marriage, duration of marriage, etc). The researchers prepared a supportive material (instructional booklet) after reviewing related literature regarding cervical cancer prevention based on evidence-based nursing and given to all study participated women. The booklet includes definition, risk factors, symptoms, and how to prevent cervical cancer in Arabic language.

Tool II: Cervical cancer Knowledge tool: it was designed by the researchers to measure the level of knowledge regarding cervical cancer, it contains 17 items. The researchers read each question and ask the women to give an answer either true or false. The scoring system was (0) if the answer is false and (1) if the answer is true with the total grade of 17. The total

knowledge scores were classified into three levels: score less than 50 % was considered poor, 50-70% was considered satisfactory and good level of knowledge when more than 70 percentage. The reliability of the tool was done using Cronbach's alpha ($r=0.84$).

Tool III: Health Belief Model Scale: It was developed by Champion (1999) and adapted by the researchers after reviewing available related literature. HBM scale covers five subscales and included 39 items (seven items for perceived susceptibility, 10 items for perceived severity, five items for perceived benefits, 10 items for perceived barrier, and seven items for cues to action). All the items of subscales have three-point likert scale response choices: agree scores 3 points, neutral scores 2 points, and disagree scores 1 point. The total score ranged from 1 to 117 points, which were scored as follows: 21 for perceived susceptibility, 30 for perceived severity, 15 for perceived benefits, 30 for perceived barrier, and 21 for cues to action. The tool was translated into 2 ways from English to Arabic and from Arabic to English to ensure accuracy. The reliability of the whole tool was done using Cronbach's alpha ($r=0.88$).

Validity and Reliability of the tool

Tools of data collection were submitted to and reviewed by a panel of experts in the fields of nursing, to test the face and content validity. Each of the experts was requested to examine tools for content coverage, clarity, wording, length, format, and overall appearance. Modifications were done according to the panel's judgment on the clarity of sentences and content appropriateness as "rephrasing and canceling for four questions" were done. Reliability analysis was conducted to investigate the instrument internal consistency, which used in the study; Cronbach's alpha coefficients were calculated to examine the measurement reliability with multipoint items.

Procedure

An official permission was taken prior to starting data collection from the administrative authority. All women who met the inclusion criteria were included in the study. The aim of the study was explained to the participants in order to be obtain their oral acceptance to be recruited in the study as well as to gain their cooperation. The researchers attended the outpatient clinic three days per week starting from 9.00 a.m. until 12:00 p.m. The study was conducted through: recruitment and interviewing, implementation, and evaluation.

Recruitment and Interviewing: Recruitment of women was carried out from May 2019 and was completed by January 2020. The interview took approximately 30 minutes for each woman; their

answers were filled in the questionnaire. All studied women were received telephone instruction. The content of the phone conversations were based on a support instructional module that was prepared by the researchers after reviewing evidenced based research and comprehensive literature. All participated women were divided into five groups with an average number of 10-15 woman. In each telephone call, researchers asked women if they had adapted the instructions given previously. The other part of the conversation was about giving information related to cervical cancer prevention and before ending the call, the women were again invited to ask their questions.

Telephone interviews were performed once weekly. The total frequency of telephone conversations was averaged five calls for each, each session lasted about 30-45 minutes using power point presentation, brochures, and group discussion sent via phone support services.

In the first session, points regarding definition, incidence, clinical features, and diagnostic test for cervical cancer were discussed by the researchers. The second session contained the followings: who gets cervical cancer and risk factors; and finally, the third session includes way of prevention regarding cervical cancer.

Evaluation was emphasized on estimating the effect of the tele-nursing service on women's knowledge and belief regarding cervical cancer prevention based on HBM twice pre and post (after 3 months) tele-nursing service implementation.

Ethical consideration:

An official permission was requested and obtained from the authoritative committee to conduct the study. Women were invited to share in the study after full explanation of the study aim. Informed oral consent was obtained from the participants to be interviewed. Furthermore, women were assured that they can withdraw from the study at any time, without penalty, if they so wished. Assigning codes rather than participants' names to maintain the anonymity were used. The participants were allowed to ask questions. They also informed that the study findings would be published in the form of presentations at conferences or in an accredited journal.

Pilot Study:

A pilot study was carried out on 8 (10%) participant of the total study sample. It was done to examine the relevance, clarity and content validity of the tools, as well as to evaluate the time needed for women to fill the questionnaires and to assess the problems and obstacles that might face the researchers during data collection. The pilot study sample were included in

the total study number as there were no modifications on the tools.

Statistical Analysis:

After completion of data collection, data were revised, coded, computed and analyzed using statistical package for social sciences (SPSS) version 23. Frequency distribution, percentages, mean and standard deviation were calculated, Chi-square and Paired sample T-test were used to describe the level of statistical significance which considered at $p < 0.05$.

Table (1): Distribution of the studied sample regarding their socio-demographic characteristics (n=75)

Socio- demographic characteristics	Study sample (n=75)	
	No.	%
Age (years old)		
• < 30	5	6.7%
• 30-40	37	49.3%
• ≥40	33	44%
Mean ± SD (years old)	39.25±6.08	
Educational qualification		
• Read and write	17	22.7%
• Primary school	8	10.7%
• Secondary school	33	44%
• University level	17	22.7%
Residence		
• Urban	17	22.75%
• Rural	58	77.3%
Work		
• Working	50	66.7%
• House wife	25	33.3%
Type of working		
• Secretary	23	30.7%
• Administrator	20	26.7%
• Teacher	7	9.3%
Level of income		
• Enough and saving	8	10.7%
• Enough	56	74.7%
• Not enough	11	14.7%

Table (2): Distribution of the studied sample regarding their Obstetrical history (no. =75)

Variables	Study sample (n=75)	
	No.	%
Mean age of menarche(years)	11.92 ± 0.91	
• M ± SD		
Age at marriage(years)		
• <20 years	39	52%
• ≥20 years	36	48%
Gravidity		
• Less than 3	23	30.7%
• More than 3	52	69.3%
Parity		
• Less than 3	16	21.3%
• More than 3	59	78.7%
Use contraceptive method		
• Yes	42	56%
• No	33	44%
Type of contraceptive method		
• No	33	44%
• Oral	8	10.7%
• IUD	14	18.7%
• Mechanical	20	26.7%
Pap smear test		
• No	63	84%
• Yes	12	16%

Variables	Study sample (n=75)	
	No.	%
Family history of cervical cancer		
• Yes	14	18.7%
• No	61	81.3%
Reason for not perform Pap smear		
• Fear from result	21	28%
• Expensive	4	5.3%
• Lack of knowledge	39	52%
• No barrier	11	14.7%

Table (3): Distribution of the studied sample regarding their Levels of Knowledge Before and After Tele-nursing Instruction (no. =75)

Level of Knowledge	Before intervention No. (%)	After intervention No. (%)
Poor ≤ 50	30(40%)	6(8%)
Satisfactory 50 - 70	41(54.7%)	4(5.3%)
Good ≥ 70	4(5.3%)	65 (86.7%)
$\chi^2 = 15.62$ $p = 0.004$		

Table (4): Distribution of the studied sample regarding Health belief model scale mean score before and after intervention (n =75)

HBM categories	Before intervention	After intervention	p-value
	M \pm SD	M \pm SD	
Perceived susceptibility	12.10 \pm 4.83	13.74 \pm 5.54	0.002*
perceived severity	18.14 \pm 6.79	20.14 \pm 7.14	0.122
Perceived barriers	18.80 \pm 2.21	21.14 \pm 5.12	0.255
perceived benefits	8.82 \pm 1.16	10.44 \pm 2.87	0.003*
cues to action	12.09 \pm 2.26	10.65 \pm 3.15	0.000*

Paired sample t-test * Significant $p < 0.05$

Table (5): Distribution of the Sample according to their beliefs toward cervical cancer prevention (no. =75)

Sub scale of Health belief model	Before instruction			After instruction		
Perceived susceptibility	Agree	Neutral	Disagree	Agree	Neutral	Disagree
1.I am at a risk for developing cervical cancer.	15.3%	0%	84.7%	31.3%	4.7%	64%
2.My chances of getting cervical cancer in the next few years are high.	14.7%	69.3%	16%	31.3%	53.3%	15.3%
3.There is a high possibility that I will get cervical cancer.	14.7%	25.3%	60%	30.7%	19.3%	50%
4.If I do not have symptoms; I do not need a Pap screening.	14.7%	34.7%	50.7%	30.7%	27.3%	42%
5.My family history puts me at risk of getting cervical cancer.	15.3%	34%	50.7%	30.7%	27.3%	42%
6.My physical health makes me likely to have cervical cancer.	14.7%	34%	51.3%	30.7%	27.3%	42%
7.I worry a lot about cervical cancer.	14.7%	25.3%	60%	26%	22.7%	51.3%
Total mean percentage of perceived susceptibility	11.30 ± 4.22			13.04 ± 5.29		
Perceived severity						
1.Cervical cancer may lead to death.	18%	75.3%	6.7%	32%	62.7%	5.3%
2.Cervical cancer may lead to a hysterectomy.	18%	8%	74%	32.7%	7.3%	60%
3.Cervical cancer is a serious health problem.	11.3%	42.7%	46%	28%	36%	36%
4.Cervical cancer can lead to a female needing chemotherapy or radiotherapy treatment.	10.7%	26%	63.3%	28%	22%	50%
5.If I have cervical cancer, my whole life will change.	10.7%	60%	29.3%	28.7%	49.3%	22%
6.Thinking about cervical cancer frightens me.	10.7%	34.7%	54.7%	28%	28.7%	43.3%
7.When I think of cervical cancer my heartbeats faster.	9.3%	43.3%	47.3%	28%	35.3%	36.7%
8.I think cervical cancer threatens my relationship with others.	9.3%	34.7%	56%	28%	29.3%	42.7%
9.Cervical cancer is a hopeless disease.	9.3%	43.3%	47.3%	28%	36.7%	35.3%
10.The physical cost of cervical cancer is very large leading to an inability to afford treatment.	9.3%	26%	47.3%	28%	21.3%	50.7%
Total mean percentage of perceived severity	17.40 ± 5.93			19.07 ± 6.73		
Perceived barriers						
1.Getting cervical test would only make me worry	14.7%	33.3%	52%	31.3%	26%	42.7%
2.Screening is not necessary as there is no cure for cancer	14%	48.7%	37.3%	30.7%	38.7%	30.7%
3.The Pap screening is painful	18%	64.7%	17.3%	34.7%	52%	13.3%
4.It is too expensive to have a Pap screening or HPV vaccination	4.7%	57.3%	38%	21.3%	47.3%	31.3%
5.It is too embarrassing to have a Pap screening	4.7%	48%	47.3%	21.3%	39.3%	39.3%
6.I have not taken the Pap test because	4.7%	77.3%	18%	21.3%	63.3%	15.3%
7.I am afraid to find out if I have cancer	4.7%	76%	19.3%	21.3%	62.7%	16%
8.Do not know where I could go if I wanted to do a screening	4.7%	66.7%	28.7%	21.3%	55.3%	23.3%
9.I do not know at what age it is necessary to have a screening test	4.7%	67.3%	28%	21.3%	55.3%	23.3%
10. I do not know how often I need to get a Pap screening	4.7%	68%	27.3%	13.3%	60.7%	26%
11. I think getting the HPV vaccination series might be unsafe or harmful to my health.	4.7%	38%	57.3%	7.3%	36.7%	56%
Total mean percentage of Perceived barriers	19.13 ± 3.60			21.28 ± 5.63		

perceived benefits						
1.A Pap screening can find cervical changes before they become cancer	7.3%	65.3%	27.3%	34%	48.7%	17.3%
2.If cervical changes are found early they are easily curable	6.7%	75.3%	18%	34%	54.7%	11.3%
3.It is important for a female to have a Pap screening so she will know if she is healthy	6.7%	55.3%	38%	34%	36.7%	29.3%
4.The Pap screening can save my life	6.7%					
5.The innovative HPV vaccine is an effective primary prevention strategy for cervical cancer.	6.7%	74.7%	18.7%	34%	54%	12%
	6.7%	75.3%	18%	34%	54.7%	11.3%
Total mean percentage of perceived benefits	9.14 ± 1.79			10.88 ± 3.04		
cues to action						
1.I eat a well-balanced diet	6.7%	84%	9.3%	82.7%	16%	1.3%
2.I always follow medical orders because I believe they will benefit my state of health	0.0%	50%	50%	61.3%	18.7%	20%
3.I frequently do things to improve my health	0%	60%	40%	44.7%	31.3%	24%
4.I take vitamins when I do not eat good meals	0%	100%	0%	50%	50%	0%
5.I search for new information related to my health	0%	100%	0%	43.3%	56.7%	0%
6.I have yearly physical examinations related to illness	0%	100%	0%	71.3%	28.7%	0%
7.I exercise regularly – at least three times a week.	0%	100%	0%	55.3%	44.7%	0%
Total mean percentage of cues to action	13.07 ± 0.92			17.46 ± 2.76		

Results

Table (1): The study sample includes 75 women from PHC center and outpatient's clinic with the mean age of the sample was 39.25 ± 6.08 year's old. About (44%) had secondary school. More than two third of the sample (77.3%) was from rural areas and (66.7%) of them working. Additionally, two third of the sample had enough level of income (74.7%) (Table, 1).

Table (2): As shown in table 2, the menarche mean age was (11.92 ± 0.91) years. About (48%) were marriage more than 20 years. Regarding contraceptive methods (26.7%) used the mechanical methods. Nearly, two third of the study sample (84%) not performed Pap smear. Reason for not performing were Fear from result (28%), Lack of knowledge (52%) and, the test was expensive (5.3%).

Table (3): It was observed in table (3) that the women had a satisfactory level, knowledge was 54.7% before intervention as compared to 5.3% after intervention, While, 86.7% of the study sample had good level of knowledge after intervention as compared to before (5.3%) with statistical significant differences ($p = 0.004$) after intervention.

Table (4): Concerning health belief model constructs among the study sample before and after intervention, there was statistically significant difference regarding Perceived susceptibility, perceived benefits, and cues to action after the intervention ($p < 0.05$) as compared to there is no statistically significant difference before and after intervention regarding perceived severity and perceived barrier ($= > 0.05$) (table, 4).

Table (5): Shows the mean score of sub-scale of health belief model and study sample, there was increased in mean percentage after intervention among study sample (Perceived susceptibility, Perceived severity, Perceived barriers, perceived benefits and cues to action)

Table (6): Shows a correlation between perceived benefit, Perceived susceptibility, Perceived barriers and level of knowledge score before intervention ($p < 0.05$). While no statistical significant difference observed between knowledge level score and health belief model score after intervention regarding cues to action ($p = > 0.05$).

Discussion

Cervical cancer is the easiest gynecologic cancer to prevent with regular screening tests and follow-up. It also is highly curable when found and treated early (CDC, 2019). Worldwide cervical cancer stays a chief public health issue and it is one of the most common gynecological cancer among women (Belgliaia et al., 2017).

As regard to socio-demographic characteristics of the current study participants, the findings showed that, the mean age of the sample was 39.25 ± 6.08 years old and nearly half of them aged 30-40 years old. This explained the women were at late childbearing period, and they were in need to be aware of preventive measures about cervical cancer because the risk of cervical cancer is more. This result is in agreement with a study by Ahmed, et al., (2018) who instituted that, high percentage of the sample was in the age of 40 years. Moreover, this result was in line with the study conducted by Myriam et al. (2012) in Mexico who reported that, more than two-thirds of the participants were in this age. Equally, this result is in agreement with a study by Ehiemere et al. (2015) in Port Harcourt who found that more than one-third of the studied women was between twenty and forty-two years as this study was done among female working in the university.

Likewise, the results of this study indicated that, about half of the study participants had secondary school and slightly less than one fourth of them read & write and had university level of education. More than two thirds of the participants were from rural areas. This is in accordance with Ahmed, et al., (2018) who illustrated that half of the sample had secondary education, and more than one-fifth of the sample had basic and university education, and only a minority of the sample was illiterate. Another supported findings by Wong et al. (2013) in Malaysia who found that more than half of the studied sample had secondary education and the minority of the sample was illiterate. On the other hand, this result inconsistent with the study findings by Duran (2014) in Turkey who found that the majority of the sample had university education.

Concerning to obstetric history, the current study showed that, the mean age of menarche 11.92 ± 0.91 years and nearly half of the sample married after age 20 years old. These findings were matched with that reported by Shobeiri et al., (2016) in Iran who found that more than half of the sample married after the age of 20 years. Regarding to gravidity and parity, the results of this study revealed that, high percentage of women had high gravidity and parity. This is may be related to the culture of Saudi Arabian community that prefer big family and increased number of children. This finding is similar with that reported by Mupepi et al., (2011) in Zimbabwean who reported that more than two thirds had gravidity of three.

Furthermore, the current study findings revealed that more than half of the sample had used contraceptive methods to control childbirth intervals. This finding is

in correspondence with **Ahmed, et al., (2018)**, who found that all of the participants were using contraceptive methods. Moreover, **Ehiemere, et al., (2015)** in Jamaica who found that more than one-third do not use contraceptive methods.

Concerning to family history of cervical cancer, the present study showed that, very low percentage of the sample had history of cervical cancer owing to the lack of women awareness about cervical cancer. This finding is in similarity with **Ahmed, et al., (2018)** who found that, none of the participants had family history of cervical cancer. This might be related to lack of women knowledge regarding cervical cancer, as some women had family history of hysterectomy without knowing the reason. Also, Davidson and **Suwan (2012)** found that 0.6% of family history of cervical cancer was among young women in Thailand. In addition to women knowledge of pap smear test and obstacle to perform it, the current study illustrated that high percentage of women did not do Pap Smear test. While, the most common obstacle to perform Pap smear was lack of knowledge related this test and fear from result of this test. This finding is in agreement with **Parsa, et al., (2017)** who found that lack of laboratory facilities and traveling to city for testing were the most important barriers to Pap smear test among the rural women.

Regarding the level of knowledge among women before and after tele-nursing instruction about cervical cancer prevention based on HBM application; the current study results shows that the total mean score of knowledge reveal statistically significant differences after intervention ($p= 0.004$). An improvement was observed after receiving tele-nursing instruction based on HBM toward cervical cancer prevention; the majority of the women had satisfied level of knowledge about cervical cancer prevention after application. This finding is similar with that reported by **Ahmed, et al., (2018)** who illustrated that, all women had poor knowledge score about cervical cancer prevention before the program, which improved drastically after the program. This might be related to the effect of the nursing educational program on knowledge. Also, Pirzadeh and **Mazaheri (2012)** in Florida who found that knowledge mean score regarding Pap smear and cervical cancer before the intervention was low, whereas, it improved significantly after the educational intervention. As well as **Rashwan et al. (2011)** who detailed that, the students in Malaysia had deprived knowledge level of cervical cancer and its prevention.

Concerning the effectiveness of tele-nursing instruction about cervical cancer prevention based on

HBM on level of knowledge and belief of the participant women. According to (**Vehei, et al., 2007 ; Al Seraty, & Ali, 2014**) designated HBM which asserts that to plan a successful educational intervention, the individual or group's perceived susceptibility; perceived severity and its consequences; perceived benefits in taking certain actions to reduce risk of cervical cancer; perceived barriers and cues to action are required.

Regarding the mean score of sub-scale of HBM, the current study explicated that, there was an increase in mean percentage after intervention among study sample. This was due to the effect of tele-nursing instruction and its fastness, and easy to find complete information on time the women need. In addition to application of HBM in changing behavior and knowledge in identification of the severity and benefits regarding to cervical cancer prevention. This finding was in agreement with (**Ahmed et al., 2018**) who found 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. Parallel findings were gained in a study carried out on students in Faculties of Benha University by Yossif and **EL Sayed (2014)**, who found that after application of self-learning package, there was a significant development in all HBM constructs. Moreover, these results are in agreement with a study approved in Iran by **Shojaeizadeh et al., (2011)** who discovered that education based on HBM was active and improve the perceived susceptibility, severity, benefits, and barriers.

Regarding to correlation between total knowledge score and total sub-scale of belief among study sample before & after tele-nursing instruction, the results revealed that, there was significant correlation between perceived benefit and level of knowledge score before intervention ($P < 0.03$). While there was significant correlation between the level of knowledge score and health belief model score after intervention, where Perceived susceptibility ($P < 0.05$), Perceived barriers ($P = 0.00$), perceived benefits ($P = 0.001$) and cues to action ($P = 0.03$) among the study sample. While there was no statistically significant difference between the level of knowledge score and health belief model score after intervention regarding perceived severity ($P = >0.05$). This finding agreed with **Shojaeizadeh, (2011)** who found that all components of HBM mean score were significantly increased after intervention compared to pre-intervention. These findings were consistent with results of many previous researches. Furthermore,

Yakhforoushha, etal (2009) evaluated the consequence of training on the voluntary health workers' knowledge and attitude regarding Pap test using HBM.

The Health Belief Model (HBM) model has proven impressive successes in improving both the behavior of individuals and groups, as well as the level of their information after applying it in more than one educational program. Such as with **Hazavehei (2007)** who conducted an educational program in Garmsar City for students using HBM to study the protective behavior of the participants regarding osteoporosis. Also, **Sharifi-Rad (2007)** who evaluated the effect of health education using HBM on preventive action against smoking among high school students. All these previous studies revealed that both knowledge and attitude of the participants significantly improved after training program. Moreover, many previous studies that dealt with the application of this model, for example **Kang & Kim (2011)**; **Juntasopeepun et al. (2012)**; & **Johnson et al. (2013)**.

Conclusion:

It can be concluded that, tele-nursing instruction through the application of the Health Belief Model (HBM) proved massive changes in improving both the beliefs of the participating women, as well as the level of their knowledge about cervical cancer prevention.

Recommendations:

Enhancement of tele-nursing instruction use in many nursing practice settings and developing future research prevention programs.

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