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Cervical Cancer Risk Factors and Screening Behavior Among Women In Taif , Saudi Arabia

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Abstract: Cervical cancer is the third most frequently diagnosed cancer worldwide, the fourth leading cause of cancer death in females in 2008.[1]

This study **aim to** assess cervical cancer risk factors and screening behaviors (Pap Smear test and endovaginal sonography) among women in Taif city, Saudi Arabia.

Subjects and Method: A descriptive cross-sectional study was used during the period from October 2014 to March 2015, conducted in different areas in Taif-city (Health College, Medical college -Taif University, Residential areas, and Shopping Mall (Qalb El Taif Mall) among 316 women ages 20 years and older.

Tool: A structured questionnaire was designed for data collection includes three parts : The socio-demographic data, knowledge of cervical cancer risk factors and knowledge about pap smear test.

Result: Most of the study sample were Saudi (70.3%) and University educated (85.4%) , mean age in was (31.5±10.7). Majority of participants had good knowledge about risk factors of cervical cancer (73.4%) and (88.3 %) of the study sample haven't heard about Pap smear test .

Conclusion : More than half of participants had poor knowledge regard pap smear test ; due to this reason , the females in Taif city should be informed about the disease and encouraged to do cervical screening (Pap smear test and endovaginal sonography) and to perform HPV vaccination.

Keywords: Cervical Cancer, Knowledge , Pap smear , Endovaginal Sonography Women.

1. Introduction

Cervical cancer is the third most frequently diagnosed cancer worldwide, the fourth leading cause of cancer death in females, and accounted for (9%) of the new cancer cases and (8%) of the cancer deaths among females in 2008.[1] Global disease cervical cancer has a major impact on the lives of women worldwide, particularly those in developing countries. According to the latest global estimates 493,000 new cases of cervical cancer occur each year among women, and 274,000 women die of the disease annually. About (83%) of new cases are in developing countries , where screening programs are not well established or effective. In most of these countries cervical cancer is the leading cause of cancer deaths among women after breast cancer. [2] Cancer cervices occurs between age (20-39) years of age. [3,4]

Cervical cancer is largely preventable by effective screening programs and papanicolaou (Pap) smear is an effective test for cervical cancer screening. [3]

The ideal ages of women for screening are (30– 40) years owing to high risk of precancerous lesions due to being sexually active; and a precancerous lesion is detectable for 10 years or more before a cancer develops. The lack of effective screening and treatment strategies is a major reason for the sharply higher cervical cancer rates in developing countries compared with developed countries. To date, screening efforts have relied largely on the Pap smear. A laboratory test developed in the 1940s to detect abnormal cell changes. [3,5] It is believed that cervical cancer, which is more common in developing countries is closely related with many factors such as life style, cultural differences, fertility behaviors, etc. Nowadays, although the etiologic causes of cervical cancers are not known for sure, as in most cancer types, epidemiologic studies show that factors such as starting to have intercourse at an early age, getting married before 18, giving birth at an early age, giving birth to more than three babies, poor genital hygiene, risky sexual behavior, refractory reproductive tract infection caused by Human Papilloma Virus (HPV), smoking cigarettes, lack of fruit/vegetable intake in a diet are cervical cancer risk factors. [6]

In Saudi Arabia 220 cases of corpus uteri cancer among females accounting for 4.1% of all newly diagnosed cases for females (5,378) in year 2010. This cancer ranked sixth among female population. The Age-Standardized Incidence Rate (ASR) was 4.6/100,000 for female

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population. The five regions with the highest ASR were : Baha region at 7.5/100,000, Eastern region at 6.4/100,000, Riyadh region at 5.8/100,000, Najran region at 5.1/100,000 and Asir region at 5 at 100,000. The median age at diagnosis was 60 years (range 28-85) years. [7]

Primary prevention strategies are reduction of known risk factors and prophylactic vaccination.[8] Human Papilloma Virus (HPV) infection has been identified as an important primary cause of cervical cancer, and the HPV vaccination is now recommended. [9]

Secondary prevention involves Pap smear screening of cervical cells to detect abnormal or precancerous cell changes. [9]

Ultrasound could be the first-line imaging technique for evaluation of early cervical cancer. [10]

Understanding the factors influencing women's decisions to obtain cervical cancer screening is essential for increasing

Transvaginal sonography (EVS) is a simple, non-invasive and relatively inexpensive imaging technique. In articles published in the 1990s, it was reported to be not very helpful in the pretreatment evaluation of invasive cervical cancer because of its low contrast resolution.[13,14,15] However, with the improved resolution of transvaginal sonography it might now be possible to measure reliably tumor size and evaluate the local extent of cervical cancer.

The lack of a regular screening tests for cervical cancer in Taif city lead to perform this study. The purpose of the study was to assess cervical cancer risk factors, and screening behaviors (Pap Smear test and endovaginal sonography) among women in Taif city, Saudi Arabia.

2.Material and Methods :

Research Design: A descriptive cross-sectional study was used during the period from October 2014 to March 2015.

Settings and Sample : The study was conducted in different areas in Taif-city (Health College, Medical college -Taif University, Residential areas, and Shopping Mall (Qalb El Taif Mall).

Subjects: A sample comprised of 316 women ages 20 years and older living in Taif city was used. Inclusion criteria were Adults females, ages 20 and older and Living in Taif city. Exclusion criteria was Females who are not willing to participate in the study.

Tool of Data Collection: A structured questionnaire was designed for data collection by the researchers based up on review of literature. It includes four parts:

First part: The socio-demographic data, such as : age; level of education , occupation, marital status, number of children and late married decrease the probability of cervical cancer.

Second Part: Knowledge of cervical cancer risk factors included 13 questions that used a 3-point Likert scale. Scores assigned to each item are between 1 and 3 points as follows; (Yes, No, and Do not know).According to rang of total scores lie between 13-39, considering good awareness as ≤ 50% of the range of total score, women were classified as: good awareness if their total score was (13-26) , and poor awareness if their total score was (27-39).

Third Part: Knowledge about pap smear test , included ten questions: have you heard about pap smear, Heard about them from, pap smear test is one of the most important screening tools for cervical cancer ,pap smear decrease mortality rate of cervical cancer, should be done 3 years after of sexual life , if repeated pap smear tests were normal, it should be done every 2-3 years ,do you have pap smear test before, why do you do and do you hear about (HPV-Human Papilloma Virus) vaccine.

Fourth Part : Knowledge about endovaginal sonography (EVS) have you heard about (EVS), and from where you heard about it and do you have (EVS) before .

EVS Protocol : The patients were examined transvaginal in the lithotomy position with an empty bladder. The cervical tumor was identified as an area with echogenicity different from that of the surrounding cervical tissue according to real-time grayscale ultrasound examination. An isoechoic tumor was identified by pushing the probe against the cervix, in which case the tumor appeared as an uncompressible lesion. Color or power Doppler ultrasound examination was not used to identify the tumor. Measurements were taken with calipers on the frozen ultrasound image. [10]

Methods: Official permission to carry out this study was obtained from the previously mentioned settings. ii. A pilot study was carried out after the development of the tools on 10 % of the sample size, iii. Data was collected through structured questionnaire to fill information related to demographic data, awareness, knowledge and practice of Pap smear test and endovaginal sonography . Once the participants who meet inclusion criteria are identified, the research assistants explained the purpose of the study to all participants, and they were informed them that their participation in the study is voluntary. Then the questionnaires were distributed to the women after oral informed consent obtaining from all participants. Women were taking 15-20 minutes to complete the questionnaire. After all questionnaires being filled by participants, all data had been entered into computer for data analysis by utilizing SPSS program.

Statistical Analysis: Data coded, entered, and analyzed using SPSS version 20. Descriptive statistical analysis was used to determine frequency distribution, and demographic variables. M(mean), SD (standard deviation) of females' cervical cancer awareness total score. Cross tabulation test used to assess differences in cervical cancer awareness groups by demographic variables.

Ethical Considerations: Women were informed about the nature of the study. Oral consent obtained from women who agreed to participate in the study. All participants were informed that their participation in the study is voluntary.

3.Results

Fig:1:Distrbuation of the study sample according to nationality

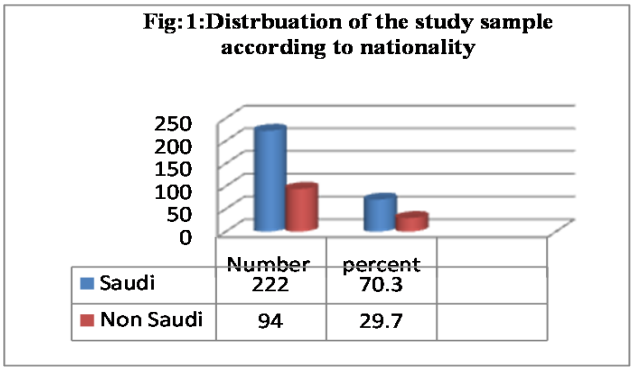

Fig 1: Most of the study sample were Saudi women 222(70.3%).

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Fig 2:Distrbuation of study sample according to level of education
N=316

	Number	Percentage
Primary	17	5.4
Secondary	29	9.2
University	270	85.4

Fig 2 : Majority of the sample had university education (85.4.3%), secondary education (9.2%) and only (5.4%) had primary school education.

Table 1: Distribution of the study sample according to their socio demographic characteristics

N=316

Variables	N	%
Age group		
20-30yrs	155	49.1
31-40yrs	78	24.7
41yr and more	83	26.3
Age Mean+ Std. Deviation	31.5	10. 7
Occupation		
Employment	156	49.4
Students	122	38.6
Housewife	38	12
Marital status		
Single	141	44.6
Married	160	50.6
Divorced	12	3.8
Widow	3	0.9
Number of children		
One	86	27.2
Two and more	175	55.4
No children	55	17.4
Late age of married decrease cervical cancer	106	33.5
Yes	98	31.0
No	112	35.4
Don't know		

Table 1: Age was ranged from (20- 60) years old. The highest frequency were 20-30 years old (49.1%),with mean± SD(31.5±10.7), (49.4%) were employee and (38.6%) were student , a small proportion who were housewife (12%), Fifty percent were married , few were divorced (3.8%) and only(0.9%) were widowed, the majority of participants had children (55.4%) while (17.4%) they don't have , the average number of children of the participating women was two and more , (35.4) don't know late age of married decrease cervical cancer and (33.5 %) answer yes regarding that(late age of married decrease cervical cancer).

Table 2: Knowledge of participant about risk factors of cervical cancer

N=316

Variable	N	%
Good knowledge	232	73.4
Poor knowledge	84	26.6
Total knowledge Means and Stander division	23.7± 6.1	

* Majority of participants had good knowledge about risk factors of cervical cancer (73.4%).
* **Table 3:** Association between demographic characteristics and knowledge about risk factors of cervical cancer

N=316

Variables	Knowledge		Total	X2	P. value
	Good knowledge N=232(73.4%)	Poor knowledge N=84(26.6%)			
Nationality				7.7	.005
Saudi	153	69	222		
Non Saudi	79	15	94		
Age group					
20-30 yr	95	60	155		
31-40 yr	67	11	78	22.9	.000
41 yr and more	70	13	83		
Level of education				5.7	.05
Primary	16	1	17		
Secondary	24	5	29		
University or higher	192	78	270		
Occupation				21.5	.000
Employment	127	29	156		
Students	72	50	122		
Housewife	33	5	48		
Marital status				21.0	.000
Single	86	55	141		
Married	132	28	160		
Divorced	11	1	12		
Widow	3	0	3		
Number of children					
One	24	11	35	6.4	.04
Two and more	104	16	120		
No children	18	3	21		
Late age of married decrease cervical cancer				60.6	.000
Yes					
No	92	14	106		
Don't know	87	11	98		
	53	59	112		

Table 3: highlighted that there was statistical significance difference between age group ,level of education ,occupation ,marital status ,number of children and late age of married decrease cervical cancer regarding awareness of cervical cancer risk factors: P≥0.05.

Association between occupation and knowledge of cervical cancer risk factors ; women with higher levels of education had a higher score of Knowledge on Cervical Cancer. P= 0.05. There was a strong association with the level of education; highly educated women knowledge was better than those

who went to primary and secondary schools. The rate of knowledge on cervical cancer is higher in employed women. Statistically significant relationship was found between the status of occupation and knowledge on cervical cancer risk factors. The rate of knowledge on cervical cancer is higher in married women and having two or more children.

Table 4: Association between demographic characteristic s and awareness about pap smear test.

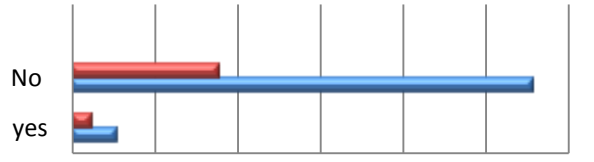
N=316

Variables	Awareness		Total	X2	P. value
	Aware N=148(46.8%)	Unaware N=168(53.2%)			
Age group					
19-29yrs	55(35.5%)	100(64.5%)	155		
30-39yrs	41(52.6%)	37(47.4%)	78	17.3	.000
40 and more yrs	52(62.7%)	31(37.3%)	83		
Level of edu					
Primary	9(52.9%)	8(47.1%)	17	1.21	0.5
Secondary	11(37.9%)	18(62.1%)	29		
University	128(47.4%)	141(52.6%)	270		
Occupation					
Employment	105(67.3%)	51(32.7%)	156	52.5	.000
Students	35(28.7%)	87(71.3%)	122		
Housewife	8(21.1%)	30(78.9%)	38		
Marital status					
Single	51(36.2%)	90(63.8%)	141	11.8	.00
Married	88(55%)	62(45.5%)	160		
Divorced	7(58.3%)	5(41.7%)	12		
Widow	2(66.6%)	1(33.3%)	3		

Table 4: There was statistical significance difference between age group , occupation and marital status regarding awareness of cervical cancer & pap smear test : P≥0.05.

Participants' knowledge about cancer cervix , pap smear & endovaginal sonography as screening tools presented in **Fig 3:** Most of respondents mentioned that they don't heard about pap smear test and EVS(88.3%).

Fig 3: Distrbuation of sample according to hearning about Pap Smear &Endovaginal Sonography as screening tools.



	yes	No	
Percent	11.7	88.3	
Number	27	279	

Table 5: Distribution of participant according to knowledge about pap smear test

N=316

Variables	N%
pap smear test is most important screening tools for early diagnosis of cervical cancer :	
Yes	141(44.6%)
No	19(6.0%)
Don't know	156(49.4%)
Pap smear test decrease mortality of cervical cancer :	
Yes	132(41.8%)
No	18(5.7%)
Don't know	166(52.5%)
Pap smear test should be done three years after onset of sexual life :	
Yes	57(18%)
No	76(24.1%)
Don't know	183(57.9%)
Practice	
Repeated pap smear tests were normal, it should be done every 2-3ys :	
Yes	83(26.3%)
No	176(55.7%)
Don't know	57(18.0%)
If No -------- (N = 176)	
Lack of knowledge about pap smear	81(46.6%)
Traditions/Shame	18(10.3%)
No pain or swelling	60(34.9%)
No female doctor	17(9.6%)
Do you have pap smear test before	
Yes	44(13.9%)
No	270(85.4%)
Don't know	2(0.6%)
If yes ---how many times?	
One time	20(45.5%)
Two and Three times	13(29.5%)
More than 3 times	11 (25%)
Why do you do pap smear (No = 316)	
Prevention from cervical cancer	123(38.9%)
Lump\pain	61(19.3%)
Diagnosis\requested	64(20.3%)
follow-up	68(21.5%)

Table 5 : Most of respondents don't know that pap smear test is most important screening tools for early diagnosis of cervical cancer , Pap smear test decrease mortality of cervical cancer and Pap smear test should be done three years after onset of sexual life {156 (49.4%),166 (52.5%) and 183(57.9%), respectively }.Regard pap smear done every 2-3years and it should be repeated if normal, more than one half(55.7%,) of participants reported they don't do that due to lack of knowledge about pap smear and they haven't pain(46.6%,34.9%,respectively). (85.4%) of women reported that they did not perform pap smear test before, however, (13.9%) reported that they performed pap smear . Among first group (45.5%) of them performed pap smear test for one time, due to fear from cervix cancer as a prevention , diagnosis/requested and follow up, (45.5%, 20.3% and 21.5%, respectively).

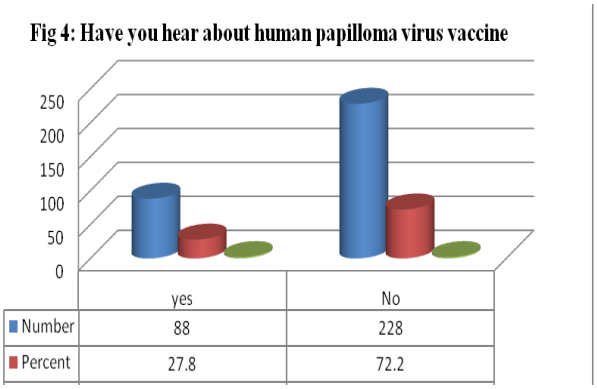


Fig 4 : (72.2%) from the sample haven't hear about papilloma vaccine.

Table 6: Participants responses about endovaginal sonography (EVS).

N=316

Table 6 : More than half of participant they don't have EVS before (57.4%) , and (38.9%) requested from them.

Variables	**N%**
Do you have (EVS) before ?	
Yes	123(38.9%)
No	181(57.4%)
Don't know	12(3.7%)
Why do you do (EVS) **(No = 316)**	
Prevention from cervical cancer	64(20.3%)
Lump\pain	61(19.3%)
Diagnosis\requested	123 (38. 9%)
follow-up	68(21.5%)

4. Discussion

Most of sample in this study were Saudi (70.3%) and University educated (85.4%) , shown in fig (1,2) , regard age the commonest age group was 20-30 year (49.1%), mean age was (31.5±10.7). This study supported by Taskin, 2012 [16] , reported that, cervical cancer is mainly found in women within the age group of (30-55) , it is started to be seen also in younger women. In addition to this, it is now a known fact that there are many other factors causing the occurrence of cervical cancer such as the socio-economic status, age of starting to have sexual intercourse, smoking, having high number of childbirth, etc. Also, similarly result with Sogukpınar N.,et al.2013[17] , reported that mean age (31.92±9.77) of the participating women shows that they are not included in the high risk group for cervical cancer.

Regarded level of education , occupation and number of children ,majority of women participant were higher level of education (85.4%) , and most of sample were married and have more than two children (55.4%), employee (49.4%) and students (38.6%) respectively as shown in table (1) , this study agree with Abiodun O , (2013) ,Mehta et al 2013 [18,19].reported that married women constituted(76.3% ,64% respectively).In term of highest level of education completed ,(42.4%) self employed petty trading and peasant farming are the most occupation engaging (69.1%) of the women , while (56%) of women had three or more children.

Majority of participants had good knowledge about risk factors of cervical cancer with percentages of (73.4%) as shown in table (2) , the reason for this result (85.4%) had higher level of education , employee and married. Increasing the women's awareness is an important first step in the long chain of conditions to attain a lower incidence and mortality. In parallel with an increased awareness, the national health care system should facilitate and encourage early diagnosis and therapy.

In this study table (3) shown that statistical significance difference between , age group , level of education , occupation , marital status , number of children and late age of married decrease cervical cancer regarding awareness of cervical cancer risk factors: P≤0.05. Association between occupation and knowledge of cervical cancer risk factors that ; women with higher levels of education had a higher score of knowledge on cervical cancer. P= 0.05. There was a strong association with the level of education; highly educated women knowledge was better than those who went to primary and secondary schools. The rate of knowledge on cervical cancer is higher in employed women. A statistically significant relationship was found between the status of occupation and knowledge on cervical cancer risk factors. The rate of knowledge on cervical cancer is higher in married women and having two or more children.

Kanpur and Canturk, 2011 [20] reported that low level of education is an important risk factor for cervical cancer because it prevents access to health possibilities and awareness.

Study demonstrated that having knowledge of cervical risk factors such as smoking, early age at first sexual intercourse, multiple sexual partners and having a sexually transmitted were risk factors of cervical cancer.[21]

Also, this result is consistent with the Nnodu O, 2010; Awodele O,. 2011[22,23] , they recorded health care workers and students of higher institutions of learning showed a high level of awareness , while in study by Sairaf and Mohammed,2009 [24], showed that knowledge and practice was inadequate among those under 30 years old, those recently married and those with a lower education level. Other study in Abha region reported a lack of knowledge about cervical and breast cancer, the most common cancers affected women in this young age, more than half of them had unsatisfactory level of knowledge.[25]

The lack of effective screening and treatment strategies is a major reason for the sharply higher cervical cancer rates in developing countries compared with developed countries. To date, screening efforts have relied largely on the Pap smear, a laboratory test developed in the 1940s to detect abnormal cell changes. In this study (53.2%) were un aware of cervical cancer screening, as shown in table (4), the level of awareness of cervical cancer screening were (46.8%). Among those that were aware of cervical and screening the commonest

sources of becoming aware were high educated , the mass media and through friends and relatives , this result agree with Abiodun O.A,2013 [18] , reported that the majority of the women interviewed were not aware of cervical cancer or screening. the level of awareness of cervical cancer and screening were (6.5% and 4.8%) respectively.

In the present study the knowledge about pap smear test was assessed using 8 points. There were eight multiple choice questions that carried a total of 24 responses (yes, no or don't know).(88.3 %) of the study sample haven't heard about Pap smear & endovaginal sonography , as shown in fig (3), (49.4%) of respondent don't know that Pap smear test is most important screening tools for early diagnosis of cervical cancer , Pap smear test decrease mortality of cervical cancer and Pap smear test should be done three years after onset of sexual life, (52.5%) and (57.9%), respectively , as shown in table (5) .this result due to poverty of knowledge regard cervical cancer screen test . Similar studies conducted elsewhere also showed that low level of knowledge, attitude and practice regarding cervical cancer among women in Kinshasa (12%) , Nigeria (46%) and Botswana (23%) despite the high incidence of this cancer, respectively.[26,27,28] Also Qatari women were with inadequate knowledge and practice among certain women groups, especially those under 30 years old, recently married, and those with low education level. The low levels of awareness have to be greatly responsible for the poverty of knowledge about cervical cancer and screening. In a general female (ages between 20 and 65 years) population in Ibadan, Nigeria, Ogun and Bejide found that that (85%) of women demonstrated very poor knowledge of cervical cancer and screening [29]. Studies in Qatar reported that 76 % of the women had knowledge about the reason for doing Pap smear. [30]

Some other studies from Kingdom of Saudi Arabia have also reported similar rates of women who were aware of the Pap smear (67.6%). [31] Metwali F et al [32] , reported that , (74.5%) of the women had knowledge about Pap smear test. The knowledge level on cervical cancer and Pap smear testing was “poor” in more than half of the participants 132 (62.26%).

Regard Pap smear done every (2-3) years and repeated even they were normal, more than half (55.7%) of participants answered with they don't do it due to lack of knowledge about Pap smear and no sign of pain (46.6% , 34.9%, respectively). (85.4%) of women reported that they did not perform Pap smear test before, however, (13.9%) reported that they performed Pap smear . Among first group (45.5%) of them performed Pap smear test for one time, due to fear from cervix cancer as a prevention, diagnosis / requested and follow up, (45.5%, 20.3% and 21.5%, respectively).The results of our study indicated that most of the study sample (14.6%) knew that pap smear test as a cervical cancer screening methods, should be done yearly, but, did not know that women should begin cervical cancer screening approximately 3 years after the first sexual life and if the repeated pap smear tests were normal, it could be done every (2-3) years, while one study done in Qatar reported that (76 %) of the women had knowledge about the reason for doing Pap smear.[33] Similar studies conducted elsewhere also showed that low level of knowledge, attitude and practice regarding cervical cancer among women in Kinshasa (12%).[34]

One study found that more than one third (2.73%) of women in Sharjah, had never been screened for cervical cancer. This proportion is similar to uptake rates reported in various countries like in Qatar (40%) and Thailand (36.6%) [35], respectively. Most common cancers affected women in this young age, more than half of them had unsatisfactory level of knowledge. Previous studies confirmed our result. [36]

In Saudi Arabia, there have been no studies showing the extent of the prevalence of this virus in the community, perhaps because cervical cancer is not frequently seen in the country. Unlike the rest of the world, cervical cancer is considered locally the eleventh most prevalent cancer among women. [37] In addition, a high prevalence of (HPV) is not expected because (HPV) is considered to be a sexually transmitted disease and Saudi society is known to be a conservative one when it comes to adult sexuality, which is supposed to exist only after matrimony. However, a previous study described a relatively high prevalence of high-risk HPV infection among women living in Riyadh [38] and recent studies in Saudi Arabia confirmed the prevalence of (HPV-16) and other high-risk (HPVs) in cervical cancer tissues. [39,40, 41]

In this study most of participant (72.2%) , haven't hear about human papilloma virus (HPV), these findings indicate that papilloma virus is commonly ignored among women , as shown in fig(4). Bayoumi M., et al [26] , reported that (49.8%) aware of (HPV) infection, However (HPV) recognized as the necessary cause of (99%) of all cervical cancers. The same result reported in other studies among different population. [41,42]

In this study (57.4%) of the participants were not heard about (EVS) and mean age of them was (31.5±10.7), and regard from where they heard about it (38.9%) know it because they requested from them as investigation procedure, table (6) , while one study stated that in developing economies screening for cervical cancer is generally recommended to commence at the age of 30 years , the maximum impact of screening has been shown when women are screened in their thirties. [43]

5. Conclusions :

Majority of participants had good knowledge about risk factors of cancer cervix with percentages of (73.4%) , in the same time more than half of participants had poor knowledge regard pap smear test ; due to this reason , the females in Taif city should be informed about the disease and encouraged to do cervical screening (Pap smear test) and to perform HPV vaccination. Awareness of women has to be raised through education (awareness lectures , posters and wall papers in the streets) and campaigning because now a days the media (TV and radio) alone is not sufficient in changing attitude or practice.

6. Recommendations:

1. Effective strategies are needed to ensure that women get screened at the appropriate ages and intervals.

2. There is a need to promote cervical cancer screening among women by informing them on their susceptibility to cervical cancer and encouraging a belief that active and regular screening can detect cervical cancer at the pre-cancerous stage, hence enabling the early treatment and prevention of cancer development.

3. All females should be informed about the disease and encouraged to do cervical screening (Pap smear test) and to perform HPV vaccination after marriage periodically for their safety and also should be advised to overcoming barriers to having the test such as fear and embarrassment because screening women for precancerous conditions will ever remain necessary.
4. Screening of older women in Taif region should be implemented as soon as possible.
5. Step up the campaign for the control of cervical cancer in Taif region.

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Conflict of interest

The author has declared no conflict of interest.

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