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IMPACT OF HEALTH EDUCATION ON EARLY DETECTION OF CERVIX CANCER IN AVERAGE RISK WOMEN

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ABSTRACT

Background: Cervical cancer development is a slow prolonged process, starting with development of precancerous lesions (cervical intra-epitheleal neoplasia, CIN) in normal cells. The aim of this study was to evaluate the impact of health education on early detection of cervical cancer in average risk women.

Methods: This cross sectional study was done in gynecology clinics at health centers that are affiliated to MOH in Tema city, Sohag governorate on 150 married women who were interviewed for health education about importance and methods for early detection taking into consideration socio-demographic data and potential risk characteristics of cervical cancer that were analyzed using univariate and multivariate analyses.

Results: Most of women in the current study were < 40 years of age (72%), ≥18 years of age at time of marriage (91.3%), had monogamous husbands (94%), had negative family history of cancer (90%), negative history of OCP use (65%), and negative history of vaginal infection (87%). Fifty percent had low SES, and 40% had ≥2 risk factors. Univariate analysis showed that history of vaginal infection (p<0.0001) and polygamous husband (p<0.0001), presence of ≥2 risk factors (p=0.0214) significantly affected CIN risk. Multivariate analysis revealed that only history of vaginal infection significantly affected CIN development (p<0.0001; HR: 0.032; 95% CI: 0.007 – 0.139)

Conclusions: Our study showed a 7% CIN rate that was significantly affected by history of vaginal infection by univariate and multivariate analyses. Health education to promote periodical pap smear among average risk married women for early detection of CIN and invasive cancer.

Keywords: Cervix cancer, CIN, Risk factors, Health education

INTRODUCTION

In developing countries including Egypt, the incidence of uterine cervix cancer is relatively higher than that in developed countries. Although being not routinely performed in Egypt, periodical pap smear helps in early detection of cancer in women of average risk of the disease. Therefore, health education program emphasizing the importance of pap smear especially in high risk women should be done.

Cervical cancer development is a slow prolonged process, starting with development of precancerous lesions (cervical intra-epitheleal neoplasia, CIN) in normal cells. About 20% of cervical cancer occurs among women over 65 years of age, with the five year survival rate of invasive cervical cancer of 71%. Fortunately, screening programs have decreased the incidence of advanced cervical cancer (Schiffman *et al.,* 2007). Average-risk women, is defined as those with no history of a precancerous lesion (CIN grade 2 or a more severe lesion) or cervical cancer, those who are not immunocompromised (including being HIV-infected), and those without in utero exposure to diethylstilbestrol (Sawaya *et al.,* 2015). There are several risk factors for the development of cervical cancer, including sexually transmitted infections, family history of cervical cancer, sexual and reproductive history, and socio-economic status (Markowitz *et al.,* 2007). HPV infection is among the most common sexually transmitted infections (STIs) and most women clear the infection within two

years without complications. Long term infection with high-risk strains of HPV can lead to the development of cervical dysplasia and cancer (Khan *et al.,* 2005). Other STIs that may be associated with development of cervical cancer include infection with bacterial vaginosis (Becker *et al.,* 1994), Chlamedia trachomatis (Josefson, 2001) and trichomnasvaginals (Donder *et al.,* 2013).

Women with a positive family history of cervical cancer, (especially of the first degree), have a two-fold risk of developing cervical cancer, suggesting an inherited susceptibility (Negri, 2005). Women with increased numbers of sexual partners, younger age at first sexual intercourse and /or multiple pregnancies have associated with increased risk of cervical cancer. Long term use of oral contraceptives (OCP) has been shown to increase risk of cervical cancer in some studies (Appleby *et al.,* 2007). Low socioeconomic status is a significant risk factor for cervical cancer (Markowitz *et al.,* 2007). This is due to a lack of screening, and failure to treat precancerous conditions (Sawaya *et al.,* 2015). Therefore, it is important for women in average risk group, to undergo periodical pap smear every 3 years till the age of sixty five (Saslow *et al.,* 2012) as well as a health education program to clarify the importance of pap smear, good personal hygiene, nutrition with vitamin rich diet, avoiding smoking, and practicing sports. The aim of this study was to evaluate the impact of health education on early detection of cervical cancer in average risk women.

METHODS

Study design: This study was designed as a cross sectional study.

Setting: This study was done in gynecology clinics at health centers that are affiliated to MCH in Tema city, Sohag governorate, where women attend for treatment and follow up. The women who were high risk for cervical cancer were interviewed to assess socio-demographic data, and potential risk factors that might increase the risk of cervical cancer. These women then underwent uterine cervix pap smear for cytological examination.

Sample: The population corresponded to 238,500 women in Tema city and villages related to it in 2015. The prevalence of CIN in Upper Egypt was 7.7% (Sanad, 2014).

Sample size based on our study design (cross sectional prevalence study), was calculated according to the following formula: N=Z2xP (1-P)/d2 (Danial, 1999). At prevalence of 7.7%, confidence level of 95%, and 5% precision, the calculated minimum sample size was 109 women. The investigators obtained a larger sample size of 150 women during the period of study from April to October, 2016.

Data collection tools: The women in the present study were interviewed (Structured interview) for health education about importance and methods for early detection as well as asked about their socio-demographic data as age, age at time of marriage, SES, and potential risk characteristics of cervical cancer as polygamy, parity, family history of cancer, history of OCP, or vaginal infection. The included women were subjected to cervical pap smear and the cytological reports were obtained to document women who revealed CIN. The potential risk factors that might affect development of CIN in our study women were analyzed using univariate and multivariate analyses.

PROCEDURE

Assessment of Socioeconomic Status (SES):

Kuppuswamy's SES scale (Aggarwal *et al.,* 2005; Kumar, 2012; Thakkar, 2015 & Guru, 2015), was used to measure SES of study women's families, based on household income (12 scores), and education (7 scores) and occupation (10 scores) of the head of the family. It was clarified that due to the steady inflation and consequent fall in the currency value, the changes in the income scale are proportional to the change in the Consumer Price Index for Industrial Workers (CPI-IW). The income groups for the year 2015 were revised to update Kuppuswamy's SES scale. The CPI-IW in 2001(considered as base income) was 100 and in 2015 were 254. So the income scale of 2001 is multiplied by 2.54 to update the scale for 2015. The family income in Rupees for each group was then transformed into Egyptian pounds. The SES classes were then identified as high (total score of 26-29), intermediate (total score of 11-25), and low (total score <10).

Ethical considerations: The study was approved by scientific and local ethical committee of the Sohag Faculty of Nursing, Egypt. An official permission was

obtained to carry out the study from Sohag Ministry of Health and written consent was obtained from the women those who are willing to participate in the study and had the right to refuse without any rational. Confidentiality and anonymity was assured.

Statistical analysis: Descriptive data including means and percentages were used for socio-demographic data and risk characteristics of cervical cancer. Comparison of women with different factors that might affect development of CIN (Univariate analysis) was done by Fischer's exact test for proportions. Multivariate analysis of risk factors of CIN was done using Cox regression test. The data of the study were analyzed with personal computer using graph prism and SPSS statistical programs. The significance level was considered as a p value < 0.05.

RESULTS

Results of the study revealed that, most of women in the current study were < 40 years of age (72%), and ≥18 years of age at time of marriage (91.3%). The vast majority of the women married with husbands who were married with only one woman "monogamous husbands (94%)", had no family history of cancer (90%), no history of OCP use (65%), and negative history of vaginal infection (87%). All women were multiparous, 55(36.7%) of them were grand multipara (with previous ≥5 deliveries). Regarding distribution of women in the study according to their socio-economic status (SES), 75(50%) had low SES, 64 had intermediate SES whereas only 11 had high SES. All women in the current study had at least one risk factor for cervical cancer, 60 (40%) of them had ≥2 risk factors (Table 1).

Table 1: Characteristics of the married women with at least one risk factor for cervical cancer

Variable	NO (%)
Age	
20 - <30 years	44 (29.3)
30 - <40 years	64 (42.7)
40 - <50 years	38 (25.3)
≥50 years	4 (2.7)
SES	
Low	75 (50)
Intermediate	64 (42.7)
High	11 (17.3)
Age at time of marriage	
<18 years	13 (8.7)
≥18 years	137 (91.3)
Parity	
Grand multi-parity	55 (36.7)
Non grand multi-parity	95 (63.3)
Positive family history	
yes	15 (10)
No	135 (90)
History of OCP	
Yes	53 (35.3)
No	97 (64.7)
History of vaginal infection	
yes	19 (12.7)
no	131 (87.3)
Husband married more than one wife	
yes	9 (6)
no	141 (94)
No of risk factor	
Only 1 factor	90(60)
>1 factor	60 (40)

Univariate analysis evaluating risk factors of cervical cancer that might affect the risk of CIN development was done and showed that out of the nine studied risk factors, only 3 factors that significantly influenced CIN development; namely history of vaginal infection, polygamous husbands, and presence of ≥2 risk factors. Results were indicated that CIN rate was statistically significant and higher in women with positive history of vaginal infection (47.4%), women who married polygamous husband (44.4%) as well as women who had ≥2 risk factors (13.3%) than in women with no history of vaginal infection (1.5%; p<0.0001), those who were married with monogamous husbands (5%; p<0.0001), and those with ≥ 2 risk factors (3.3%; p=0.0214), respectively. On the other hands, the other factors did not significantly affect CIN rate (p>0.05), such as old age, younger age at time of marriage, grand multi-parity, low SES, positive family history of cancer, and positive history of previous use of OCP (Table 2).

Table 2: Univariate analysis of risk factors that might affect development of CIN

Variable	No. (%)	CIN No. (%)	*P* value
SES			
Low	75 (50)	7(9.3)	0.347
Intermediate& High	75 (50)	4(5.3)	
Age at time of marriage			
<18 years	13 (8.7)	2(15.4)	0.244
≥18 years	137 (91.3)	9(6.6)	
Parity			
Grand multi-parity(≥5)	55 (36.7)	3(5.5)	0.502
Multi-parity(2-4)	95 (63.3)	8(8.4)	
Positive family histoy			
yes	15 (10)	2(13.3)	0.347
No	135 (90)	9(6.7)	
History of OCP			
Yes	53 (35.3)	2(3.8)	0.216
No	97 (64.7)	9(9.3)	
History of vaginal infection			
yes	19 (12.7)	9(47.4)	<0.0001*
no	131 (87.3)	2(1.5)	
Husband married more than one wife			<0.0001*
yes	9 (6)	4(44.4)	
no	141 (94)	7(5)	
No of risk factor			0.0214*
1 factor	90(60)	3(3.3)	
>1 factor	60 (40)	8(13.3)	
Total	150 (100)	11 (7.3)	-

Cox-regression multivariate analysis revealed that among the risk factors that significantly affected CIN rate, positive history of vaginal infection was the only independent risk factor that significantly affected CIN development (p<0.0001; HR: 0.032; 95% CI: 0.007 – 0.139) (Table 3).

Table 3: Cox regression multivariate analysis of risk factors that might independently affect CIN development

Variable	*P* Value	HR	95% CI
History of vaginal infection	<0.0001*	0.032	0.007 – 0.139
No. of wives of each husband	0.208	-	-
No. of RF of each women	0.585	-	-

DISCUSSION

The present study included 150 women, each of them had at least one risk factor of cervical cancer such as low SES, <18 years at time of marriage, grand multiparity (≥5 births), positive family history of cancer, positive history of using OCP, and positive history of vaginal infection. The prevalence of CIN was found among 7.3% patients with no cases of invasive cancer. Our prevalence rates are comparable with reported studies (Selo-Ojeme, 2004; Ray & Kaul, 2008; Sahu, *et al.,* 2007) where the prevalence rates of CIN ranged between 6.8 to 9%, but the prevalence of invasive cervical cancer was zero. However, Obeidat & Saidi (2012) revealed a slightly higher prevalence rate (12%) than that of our study. This may be due to inclusion of larger number of cases in the reported study (1470 cases) than that in the current study. However, another study conducted by Schiff *et al.,* (2000) showed a much higher prevalence rate of CIN (25.5%). This difference may be due to the fact that, in contrast to the current study, the reported study included a great proportion of cases (250 out of 348; 71.8%) having ≥2 life time sex partners, leading to increased risk of sexually transmitted infections. In contrast to most of the reported studies (Faggiono *et al.,* 1997; Brown, Harding & Bethune, 1997) that documented an increased risk of cervical cancer among women of lower socioeconomic status (SES), our study did not reveal a significant impact of SES on development of CIN. The low impact of SES on the risk of CIN could be explained on the ground that most of women of low socio-economic status had very low family income scores but relatively higher educational scores. Brinton and Fraumeni (1986), who found that socioeconomic education score is inversely proportional to the risk of cervical cancer, confirmed our results. Moreover, the finding is matched with that reported by Schiff *et al.,* (2000) who did not find an association between SES and risk of cervical cancer.

Regarding the remaining risk factors, the present study showed that the risk of developing CIN was not significantly affected by age at time of marriage, history of using OCP, parity, and family history. Early age (<18 years) at first marriage leads to early age at first sexual intercourse which has been associated with an increased risk of Human papillomavirus (HPV) infection, that is responsible for most cases of invasive cervical cancer (Bosch *et al.,* 2002).

Furthermore, a study conducted by Louie *et al.,* (2009), showed that women who initiated first sexual intercourse at a young age are at an increased risk of cervical cancer. The lack of impact of marriage at younger age on CIN development in our study could be attributed to the fact that women who first experienced early sexual intercourse and had only one sexual partner had reduced risk of sexually transmitted infections in contrast to most women in the reported studies. The rate of Oral Contraceptive Pills (OCP was 35% among our women, the vast majority of them for <5years) was not associated with significant increase of CIN development. This is in agreement with Moreno *et al.,* (2002), who stated that patients who had used oral contraceptives for <5 years did not have increased risk of cervical cancer when compared to non users (odds ratio 0.73; 95% CI 0.52-1.03). Although multiparity with short interval between births is assumed to be associated with an increased risk of CIN, as pregnancy maintains the transformation zone on the ectocervical region, thus increases its susceptibility to dysplasia inducing external agents (Autier *et al.,* 1996). The grand multipara did not show significantly high CIN rate. In a study conducted by Hinkula *et al.,* (2004) it was reported that the incidence of cervical cancer and CIN among grand multipara (women with at least five biological children) was slightly higher than that among average female population. On the other hands, several studies did not show any role for multiparityas a risk factor of cervical cancer and CIN (Cuzick *et al.,* 1996; Parazzini *et al.,* 1998; Munoz *et al.,* 2002). In contrast to a reported

study conducted by Zelmanowicz, *et al.,* (2005), it was suggested that a positive family history of cervical cancer in a first-degree relatives is associated with increased risk of CIN and invasive cervical squamous cell carcinoma. Our results did not find that significant association. The positive family history in our study was not specified to cervix cancer but to breast, colon and lung cancers. From epidemiological studies, a strong association was revealed between development of cervical neoplasia and increased sexual activity observed by multiple sexual partners and / or practicing sexual intercourse at earlier age (Arends *et al.,* 1998), leading to increased risk of sexually transmitted infections, notably HPV (Teixeira, *et al.,* 2012; Augusto, dos Santos & Oliveira, 2014). Univariate analysis in the current study showed that women whose husbands had more than one wife (polygamy), and women with positive history of vaginal infection regardless of its type, had significantly higher rate of CIN ($p<0.0001$) than their counterparts in each category. The significant increase of CIN rate among women with history of vaginal infections as well as among women with polygamous husbands, than that in monogamous women, elevates the probability of vaginal infections in our study to be considered as sexually transmitted infections. Moreover, the current study also showed that women with more than one risk factor had a higher CIN rate than those with only one risk factor ($p=0.0214$). Multivariate cox regression analysis confirmed that positive history of vaginal infection was the only independent risk factor causing high rate of CIN. This direct relationship between vaginal infection and CIN development explains a relatively low CIN rate in our study (7.3%) due to the relatively low rate of vaginal infection (12.7%). In reported studies among monogamous women, the risk of cervical cancer was reported to be 2 to 8 times for women with polygamous husbands (Brinton, *et al.,* 1989). Furthermore, it was found that promiscuity is a factor that has been associated with the male risk factor in development of cervical cancer (Castellsague, *et al.,* 2003). Study results are confirmed by data reported by Schiff *et al.,* (2000), who found that a positive history of sexually transmitted infection was a significant risk factor for CIN development. In this reported study, sexually transmitted infection with HPV of any type, was a strong risk factor for CIN. Regardless of the type of sexually transmitted infection, a high risk of CIN was found among women with infection with HPV (Davidson *et al.,* 1994), bacterial vaginosis, chlamydia trachomatis (Gillet *et al.,* 2011), and trichomonasvaginalis (Josefson, 2001), in comparison with women with no infection. However, it was demonstrated that HPV was also present as a CIN causative agent in women where trichomonasvaginalis, bacterial vaginosis and/or possibly chlamydia trachomatis (Peters van Leeuwen & Pieters, 1995) were discovered.

The results of the present study emphasized the importance the health education given to the women to encourage them for periodical pap cervical smear for early detection of women with CIN. The health education in the present study recommended periodical cervical screening every 3 years for married women till the age of >65 years if they have had 3 consecutive negative cytology results according to cervical cancer screening guidelines for average-risk women (Saslow *et al.,* 2012; ACOG, 2012).

CONCLUSION

The study showed a 7% CIN rate that was significantly affected by risk of vaginal infection, and polygamy. Multivariate analysis confirmed vaginal infection as an independent risk factor. Health education is recommended to encourage average risk married women to undergo periodical pap cervical smear every 3 years for early detection of CIN and invasive cancer.

Limitations of the study

There were some limitations to the present study. First, the study was a cross sectional study to just assess the prevalence of CIN and not a prospective series to assess the effect of given health education on attitude of study subjects regarding periodical pap cervical smear. Second, The HPV infection was not assessed to document its association with development of CIN.

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REFERENCES

Aggarwal, O. P., Bhasin, S. K., Sharma, A. K., Chhabra, P., Agarwal, K. & Rajoura, O. P. (2005). A new instrument (scale) for measuring the socioeconomic status of a family: Preliminary study. *Indian Journal of Community Medicine*, 30(4), pp111-114.

Arends, M. J., Buckley, C. H. & Wells, M. (1998). Aetiology, pathogenesis, and pathology of cervical neoplasia. *Journal of Clinical Pathology*, 51(2), pp 96-103.

Augusto, E. F., dos Santos, L. S. & Oliveira, L. H. S. (2014). Human papillomavirus detection in cervical scrapes from women attended in the Family Health Program. *Revista Latino-Americana De Enfermagem*, 22(1), pp 100-107.

Autier, P. C. M., Huet, F. & Grivegnee, A. R. (1996). Transformation zone location and intraepithelial neoplasia of the cervix uteri. *British Journal of Cancer*, 74(3), pp 488–490.

Becker, T. M., Wheeler, C. M. & McGough, N. S. (1994). Sexually transmitted diseases and other risk factors for cervical dysplasia among southwestern Hispanic and non-Hispanic white women. *JAMA*, 271(15), pp 1181–1188.

Bosch, F. X., Lorincz, A., Munoz, N., Meijer, C. J. & Shah, K. V. (2002). The causal relation between human papillomavirus and cervical cancer. *Journal of Clinical Pathology*, 55(4), pp 244–265.

Brinton, L. A. & Fraumeni, J. F. Jr. (1986). Epidemiology of uterine cervical cancer. *Journal of Chronic Diseases*, 39(12), pp 1051–65.

Brinton, L. A., Reeves, W. C., Brenes, M. M., Herrero, R., Gaitan, E., Tenorio, F., de Britton, R. C., Garcia, M. & Rawls, W. E. (1989). The male factor in the etiology of cervical cancer among sexually monogamous women. *International Journal of Cancer*, 44(2), pp 199– 203.

Brown, J., Harding, S. & Bethune, A. (1997). Incidence of health of the nation cancers by social class. *Population Trends*, (90), pp 49–77.

Castellsague, X., Bosch, F. X. & Munoz, N. (2003). The male role in cervical cancer. *Salud Publ Mex*, 45(Suppl 3), pp S345–S353.

Committee on Practice Bulletins—Gynecology Obstet Gynecol (2012). ACOG Practice Bulletin Number 131: Screening for cervical cancer, 120(5), pp 1222-38.

Cuzick, J., Sasieni, P. & Singer, A. (1996). Risk factors for invasive cervix cancer in young women. *European Journal of Cancer*, 32A, pp 836–841.

Danial, W. W. (1999). Biostatistics: A foundation for analysis in the health sciences. 7th edition. New York: John Wiley & Sons.

Davidson, M., Schnitzer, P. G. & Bulkow, L. R. (1994). The prevalence of cervical infection with human papillomaviruses and cervical dysplasia in Alaska Native women. *The Journal of Infectious Diseases*, 169(4), pp 792–800.

Donders, G. G. G., Depuydt, C. E., Bogers, J-P. & Vereecken, A. J. (2013). Association of Trichomonasvaginalis and Cytological Abnormalities of the Cervix in Low Risk Women. *PLoS ONE*, 8(12), pp e86266.

Faggiano, F., Partanen, T., Kogevinas, M. & Boffetta, P. (1997). Socioeconomic differences in cancer incidence and mortality. Lyon, France: International Agency for Research on Cancer, 138, pp 65–176.

Gillet, E., Meys, J. F. A., Verstraelen, H., Bosire, C., De Sutter, P., Temmerman, M. & Broeck, D. V. (2011). Bacterial vaginosis is associated with uterine cervical human papillomavirus infection: a meta-analysis. *BMC Infectious Diseases*, 11, 10, pages 9.

Guru Raj, M. S., Shilpa, S. & Maheshwaran, R. (2015). Revised Socio-Economic Status for Urban and Rural India-Revision for 2015. *Socioeconomica*, 4(7), pp 167 – 174.

Hinkula, M., Pukkala, E., Kyyronen, P., Laukkanen, P., Koskela, P., Paavonen, J., Lehtinen, M. & Kauppila, A. (2004). A population-based study on the risk of cervical cancer and cervical intraepithelial neoplasia among grand multiparous women in Finland. *British Journal of Cancer*, 90(5), pp 1025 – 1029.

International Collaboration of Epidemiological Studies of Cervical Cancer1, Appleby, P., Beral, V., Berrington de González, A., Colin, D., Franceschi, S., Goodhill, A., Green, J., Peto, J., Plummer, M. & Sweetland, S. (2007). Cervical cancer and hormonal contraceptives: collaborative reanalysis of individual data for 16,573 women with cervical cancer and 35,509 women without cervical cancer from 24 epidemiological studies. *Lancet,* 370(9599), pp 1609-1621.

Josefson, D. (2001). Chlamydia increases risk of cervical cancer. *BMJ*, 322(7278), pp 71.

Khan, M. J., Partridge, E. E., Wang, S. S. & Schiffman, M. (2005). Socioeconomic status and the risk of cervical intraepithelial neoplasia grade 3 among oncogenic human papillomavirus DNA-positive women with equivocal or mildly abnormal cytology. *Cancer*, 104(1), pp 61-70.

Kumar, N., Gupta, N. & Kishore, J (2012). Kuppuswamy's socioeconomic scale: updating income ranges for the year 2012. *Indian Journal of Public Health*, 56(1), pp 103-104.

Louie, K. S., de Sanjose, S., Diaz, M., Castellsague, X., Herrero, R., Meijer, C. J., Shah, K., Franceschi, S., Munoz, N. & Bosch, F. X; International Agency for Research on Cancer Multicenter Cervical Cancer Study Group (2009). Early age at first sexual intercourse and early pregnancy are risk factors for cervical cancer in developing countries. *British Journal of Cancer*, 100(7), pp 1191 – 7.

Markowitz, L. E., Dunne, E. F., Saraiya, M., Lawson, H. W., Chesson, H. & Unger, E. R. (2007). Centers for Disease Control and Prevention (CDC); Advisory Committee on Immunization Practices (ACIP). Quadrivalent Human Papillomavirus Vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recommendations and Reports - CDC*, 56, pp 1-24.

Moreno, V., Bosch, F. X., Muñoz, N., Meijer, C. J., Shah, K. V., Walboomers, J. M., Herrero, R. & Franceschi, S. (2002). Effect of oral contraceptives on risk of cervical cancer in women with human papillomavirus infection: the IARC multicentric case-control study. *Lancet*, 359(9312), pp 1085 -92.

Muñoz, N., Franceschi, S., Bosetti, C., Moreno, V., Herrero, R., Smith, J. S., Shah, K. V., Meijer, C. J. & Bosch, F. X; International Agency for Research on Cancer. Multicentric Cervical Cancer Study Group (2002). International Agency for Research on Cancer Multicentric Cervical Cancer Study G. Role of parity and human papillomavirus in cervical cancer: the IARC multicentric case– control study. *Lancet*, 359(9312), pp 1093-101.

Negri, E., La Vecchia, C., Bosetti, C., Franceschi, S. & Parazzini, F. (2005). Risk of cervical cancer in women with a family history of breast and female genital tract neoplasms. *International Journal of Cancer*, 117, pp 880-1.

Obeidat, R. & Saidi, S. A. (2012). Prevalence of High-Grade Cervical Intraepithelial Neoplasia (CIN) and Cervical Cancer in Women with Post-Coital Bleeding (PCB) and Negative Smear: A Retrospective Study. *Gynecology & Obstetrics*, 2, pp 127.

Parazzini, F., Chatenoud, L., La Vecchia, C., Negri, E., Franceschi, S. & Bolis, G. (1998). Determinants of risk of invasive cervical cancer in young women. *British Journal of Cancer*, 77(5), pp 838–841.

Peters, N., van Leeuwen, A. M. & Pieters, W. J, (1995). Bacterial vaginosis is not important in the etiology of cervical neoplasia: a survey on women with dyskaryotic smears. *Sexually Transmitted Diseases*, 22(5), pp 296–302.

Ray, P. & Kaul, V. (2008). Prevalence of high-grade squamous intraepithelial neoplasia (HiSIL) in symptomatic women referred to the colposcopy clinic with negative cytology. *Archives of Gynecology and Obstetrics*, 277(60), pp 501–504.

Sahu, B., Latheef, R. & AboelMagd, S. (2007). Prevalence of pathology in women attending colposcopy for postcoital bleeding with negative cytology. *Archives of Gynecology and Obstetrics*, 277(6), pp 471-3.

Sanad, A. S., Kamel, H. H. & Hasan, M. M. (2014). Prevalence of cervical intraepithelial neoplasia (CIN) in patients attending Minia Maternity University Hospital. *Archives of Gynecology and Obstetrics*, 289(6), pp 1211-1217.

Saslow, D., Solomon, D., Lawson,H. W., Killackey, M., Kulasingam, S., Cain,J., Garcia, F. A. R., Moriarty, A., Waxman, A., Wilbur, D., Wentzensen, N., Downs, L., Spitzer, M., Moscicki, AB., Franco, E. L., Stoler, M. H., Schiffman, M., Castle, P. E. & Myers, E. R. (2012). American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology screening guidelines for the prevention and early detection of cervical cancer. *CA Cancer CA: A Cancer Journal for Clinicians*, 62(3), pp 147–172.

Sawaya, G. F., Kulasingam, S., Denberg, T. D. & Qaseem, A, (2015). Cervical Cancer Screening in Average-Risk Women: Best Practice Advice from the Clinical Guidelines Committee of the American College of Physicians. *Annals of Internal Medicine*, 162(12), pp 851-859.

Schiff, M., Becker, T. M., Masuk, M., van Asselt-King, L., Wheeler, C. M., Altobelli, K. K., North, C. Q. & Nahmias, A. J. (2000). Risk Factors for Cervical Intraepithelial Neoplasia in Southwestern American Indian Women. *American Journal of Epidemiology*, 152(8), pp 716 – 26.

Schiffman, M., Castle, P. E., Jeronimo, J., Rodriguez, A. C. & Wacholder, S. (2007). Human papillomavirus and cervical cancer. *Lancet*, 370(9590), pp 890-907.

Selo-Ojeme, D. O., Dayoub, N., Patel, A. & Metha, M. (2004). A clinico-pathological study of postcoital bleeding. *Archives of Gynecology and Obstetrics,* 270(1), pp 34-36.

Teixeira, N. C., Araújo, A. C., Correa, C. M., Lodi, C. T., Lima, M., Carvalho Nde, O., Castillo, D. M. & Melo, V. H. (2012). Prevalence and risk factors for cervical intraepithelial neoplasia among HIV-infected women. *Brazilian Journal of Infectious Diseases*, 16(2), pp 164-169.

Thakkar, H. & Rawat, C. M. S. (2015). Kuppuswamy's Socio-economic Status Scale: Updating Income Ranges for

the Year 2015. *Indian Journal of Community Health*, 27(4), pp 415-417.

Zelmanowicz, A. M., Schiffman, M., Herrero, R., Goldstein, A. M., Sherman, M. E., Burk, R. D., Gravitt, P., Viscidi, R., Schwartz, P., Barnes, W., Mortel, R., Silverberg, S. G., Buckland, J. & Hildesheim, A. (2005). Family history as a co-factor for adenocarcinoma and squamous cell carcinoma of the uterine cervix: Results from two studies conducted in Costa Rica and the United States. *International Journal of Cancer*, 116(4), pp 599-605.