

Assessment of Cervical Cytology in the Early Detection of Precancerous Lesions: A Pap Smear-Based StudyRagini Singh¹, B.K. Choudhary²¹Senior Resident, Department of Obstetrics and Gynecology, MGM Medical College, Jamshedpur, Jharkhand, India²Unit Head, Department of Obstetrics and Gynecology, MGM Medical College, Jamshedpur, Jharkhand, India

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Abstract:**Background:** Cervical cancer remains a major public health concern, particularly in developing countries, where limited screening leads to late diagnosis and high mortality. Early detection of precancerous lesions through cytology is crucial for prevention.**Aim:** To assess the role of cervical cytology (Pap smear) in the early detection of precancerous lesions.**Methodology:** A hospital-based cross-sectional observational study was conducted on 80 sexually active women aged >21 years in the Department of Obstetrics and Gynecology, MGM Medical College, Jamshedpur. Pap smears were collected and reported using the Bethesda System. Abnormal cases were further evaluated by colposcopy and biopsy.**Results:** Most participants were aged 21–30 years. Vaginal discharge (37.5%) was the most common complaint. Pap smear findings showed 62.5% NILM, while 32.5% had epithelial abnormalities (ASC-US 12.5%, LSIL 10%, HSIL 7.5%). Abnormal findings increased with age, especially >40 years. Biopsy revealed CIN I (34.6%) as the most common lesion, with carcinoma cervix in 7.7% cases.**Conclusion:** Pap smear is an effective tool for early detection of precancerous lesions. Regular screening and timely intervention can significantly reduce cervical cancer burden.**Keywords:** Cervical Cytology, Pap Smear, Precancerous Lesions, CIN, Screening.**DOI:** 10.25258/Ijpqa.17.1.71

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Introduction

Cervical cancer presents a major health threat and stands as one of the most common cancer-related deaths among women throughout the world [1]. The disease maintains a substantial health system burden, which affects low- and middle-income countries because these nations lack sufficient resources for preventive and diagnostic medical services. The World Health Organization estimates that each year hundreds of thousands of women worldwide receive cervical cancer diagnoses, with many of them dying from the disease because they receive their diagnosis at an advanced stage and do not receive proper medical care [2]. The slow development of cervical cancer from its initial precancerous stage to full-blown invasive carcinoma creates an essential period during which medical professionals can identify the disease and provide treatment. Resource-limited areas fail to take advantage of this opportunity because they lack both screening resources and public knowledge about the disease.

Cervical cancer presents a greater health burden in developing countries, including India, than in developed countries. The gap between high-income countries and developing nations exists because high-income countries use organized cytology-based screening programs, which have successfully decreased both cervical cancer incidence and mortality rates in recent decades [3]. Developing countries experience various difficulties, which include their insufficient healthcare facilities, their shortage of qualified healthcare workers, and their restricted access to cervical cancer screening programs. The existing obstacles prevent timely detection of cervical abnormalities, which results in increased sickness rates and death rates.

The disease occurs more frequently in low-resource areas because limited awareness and insufficient healthcare facilities together with cultural obstacles and nonexistent screening programs create difficulties for local people. According to the World Cancer Statistics, more than 80% of all cervical cancer cases

are reported from developing countries, with India alone accounting for over one-fifth of global cervical cancer deaths [4]. In India, approximately 122,844 women receive cervical cancer diagnoses each year while the disease causes approximately 67,477 women to die. The country needs immediate screening solutions and early diagnostic methods to decrease its cervical cancer problem according to these disturbing statistics.

Cervical cancer has many opportunities for prevention; it progresses through a long preinvasive stage which allows early detection and intervention [5]. The normal cervix changes from normal epithelium to abnormal precancerous lesions, such as cervical intraepithelial neoplasia (CIN) to eventually become cancer and this can happen in as few as five years. The time that it takes for these changes to occur allow many opportunities to use screening techniques to detect early signs of disease and provide effective intervention for the precancerous lesions before they develop into cancer. Early detection of any cellular abnormalities is important to reducing the progression of the disease and to improving patient health.

The Papanicolaou (Pap) smear test remains the cornerstone of cervical cancer screening due to its simplicity, noninvasive nature, cost-effectiveness, and ability to detect precancerous cervical intraepithelial neoplasia before progression to invasive disease [6]. The Pap smear test has proven to be effective because it shows a significant decrease in both cervical cancer cases and death rates in areas where the test is routinely used. The test requires collectors to gather exfoliated cervical cells which they will study under a microscope to identify cytological abnormalities. The Pap smear shows approximately 70.8% sensitivity for detecting high-grade squamous intraepithelial lesions (HSIL), which becomes more effective through the addition of HPV DNA testing. The implementation of HPV testing, which detects high-risk viral strains that cause cervical cancer, enhances the screening programs' ability to predict outcomes accurately and identify high-risk cases.

Regular and timely screening using these methods can prevent the development of invasive cervical cancer and reduce associated morbidity and mortality. Early detection of abnormalities such as atypical squamous cells, low-grade squamous intraepithelial lesions (LSIL), and HSIL enables prompt clinical management, including surveillance, medical treatment, or surgical intervention as required. Consequently, the role of cervical cytology in the early detection of precancerous lesions cannot be overstated, as it serves as a critical tool in the prevention and control of cervical cancer.

The rural residents and people from low-income backgrounds show low understanding and low participation rates in cervical cancer screening

programs, even though screening tools exist which can effectively detect the disease. Many women do not seek screening due to lack of knowledge, fear, social stigma, or limited access to health-care facilities [7]. Women often refrain from taking part in routine screening programs because of their incorrect understanding of the process, their worries about privacy protection, and their cultural restrictions. The combination of these factors leads to delayed diagnosis which occurs when the disease has reached an advanced stage, resulting in lower chances of successful treatment.

Women in their health-seeking behavior exhibit two patterns which lead to their medical problems remaining undiagnosed until they need urgent treatment. The problem becomes worse because women face gender discrimination and they cannot make decisions while their health needs to be neglected for family duties. Educational initiatives aimed at raising awareness about cervical cancer, its risk factors, and the importance of early detection are essential. Women and their families should receive guidance about how to identify early symptoms and understand the importance of regular Pap smears and need for follow-up care after abnormal results [8]. The combination of community awareness programs and healthcare worker participation and health education in primary care services creates a strong foundation for increasing screening rates.

The primary health care system needs development to establish accessible screening programs and follow-up systems which will help decrease the national cervical cancer burden [9]. The implementation of effective screening methods at primary health care facilities and community health centers will enable the early detection of precancerous lesions which will allow doctors to provide treatment before the disease becomes invasive. The combination of opportunistic screening and organized outreach programs delivers a substantial improvement in screening coverage for underserved populations. Healthcare providers need training in sample collection procedures and cytological interpretation and patient counseling practices to achieve successful screening program outcomes.

The establishment of HPV vaccination programs through their existence with screening services will lead to reduced cervical cancer rates which will extend into the future [10]. Prophylactic vaccines that target high-risk HPV strains show strong effectiveness in stopping cervical infections which lead to precancerous lesions. The combination of vaccination with regular cytological screening creates a complete system for preventing cervical cancer. The effectiveness of integrated strategies depends on three factors, which include public acceptance and affordable solutions and national implementation success.

In this context, the present study on the Assessment of Cervical Cytology in the Early Detection of Precancerous Lesions: A Pap Smear-Based Study assumes significant importance. By evaluating cytological findings and identifying the prevalence of precancerous lesions among the study population, this research aims to contribute to the existing body of knowledge and highlight the role of Pap smear screening in early diagnosis. The findings of this study may help in formulating effective screening strategies, improving awareness, and ultimately reducing the burden of cervical cancer through timely detection and intervention.

Methodology

Study Design: This study was designed as a hospital-based cross-sectional observational study aimed at assessing cervical cytology for the early detection of precancerous lesions using Pap smear examination.

Study Area: The study was conducted in the Department of Obstetrics and Gynecology, MGM Medical College, Jamshedpur, Jharkhand, India in collaboration with the Department of Pathology for cytological evaluation.

Study Duration: The duration of the study for one year from December 2003 to November 2004.

Study Participants: The study population comprised sexually active women aged above 21 years attending the Obstetrics and Gynecology outpatient department with complaints suggestive of cervical pathology.

Inclusion Criteria

- Sexually active women aged >21 years
- Women presenting with the following symptoms:
 - Vaginal discharge
 - Blood-mixed or foul-smelling discharge
 - Postcoital bleeding
 - Intermenstrual bleeding
 - Postmenopausal bleeding
 - Lower abdominal pain
 - Infertility
 - Secondary amenorrhea
- Women willing to provide informed written consent

Exclusion Criteria

- Women not willing to participate in the study
- Presence of frank cervical growth on clinical examination
- Previously treated cases of cervical cancer
- Pregnant women

Sample Size: A total of 80 participants meeting the inclusion criteria were enrolled in the study.

Procedure: Data collection was carried out using a structured and pre-tested proforma. After obtaining informed written consent, a detailed history of each participant was recorded, including demographic profile, menstrual history, obstetric history, sexual history, and presenting complaints. This was followed by a thorough clinical examination, including per-speculum and per-vaginal examination, and all findings were documented systematically while maintaining patient confidentiality.

For Pap smear collection, each participant was placed in the lithotomy position. A sterile bivalve speculum was inserted to visualize the cervix clearly. A cervical cytology sample was obtained from the ectocervix using a wooden Ayre's spatula, rotated 360° around the external os to ensure adequate sampling. The collected material was evenly smeared onto a clean, labeled glass slide and immediately fixed in 95% ethyl alcohol to prevent air-drying artifacts.

The prepared slides were then sent to the Department of Pathology for cytological examination. Reporting of cervical cytology was done according to the Bethesda System, categorizing the smears as negative for intraepithelial lesion or malignancy (NILM) or showing epithelial cell abnormalities such as atypical squamous cells of undetermined significance (ASC-US), low-grade squamous intraepithelial lesion (LSIL), high-grade squamous intraepithelial lesion (HSIL), or glandular abnormalities.

Participants with abnormal cytological findings were referred for further evaluation by colposcopy. Those with suspicious colposcopic findings (Reid score ≥ 6) underwent colposcopy-guided cervical biopsy. Subsequent management was planned based on histopathological findings and severity of lesions.

Statistical Analysis: All collected data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to summarize demographic characteristics, clinical features, and cytological findings. The association between categorical variables was assessed using the Chi-square test or Fisher's exact test, as appropriate. A p-value of <0.05 was considered statistically significant. The results were presented using tables, graphs, and charts for better interpretation and clarity.

Result

Table 1 shows the distribution of participants according to age group among a total of 80 individuals. The majority of participants belonged to the 21–25 years age group, comprising 22 individuals (27.50%), followed by the 26–30 years group with 20 participants (25.00%). The 31–35 years age

group included 14 participants (17.50%), while both the 36–40 years and above 40 years groups had an equal representation of 12 participants each (15.00%). Overall, the data indicate that a higher

proportion of participants were in the younger age groups (21–30 years), whereas relatively fewer participants were observed in the older age categories.

Age Group (years)	Frequency (n)	Percentage (%)
21–25	22	27.50%
26–30	20	25.00%
31–35	14	17.50%
36–40	12	15.00%
>40	12	15.00%
Total	80	100%

Table 2 shows the distribution of participants according to presenting complaints among the study population (n = 80). The most common complaint was vaginal discharge, reported by 30 participants (37.50%), indicating it as the predominant symptom prompting clinical evaluation. This was followed by blood-mixed or foul-smelling discharge in 12 cases (15.00%), which may suggest underlying infections or possible pathological changes. Postcoital bleeding was observed in 10 participants (12.50%), while both intermenstrual bleeding and lower abdominal

pain were reported equally in 8 cases each (10.00%). Postmenopausal bleeding, a clinically significant symptom often associated with higher risk of malignancy, was noted in 6 participants (7.50%). Infertility was reported by 4 participants (5.00%), and secondary amenorrhea was the least common complaint, seen in only 2 participants (2.50%). Overall, the findings indicate that abnormal vaginal discharge and bleeding patterns were the leading presenting complaints among the study subjects.

Presenting Complaint	Frequency (n)	Percentage (%)
Vaginal discharge	30	37.50%
Blood-mixed/foul-smelling discharge	12	15.00%
Postcoital bleeding	10	12.50%
Intermenstrual bleeding	8	10.00%
Postmenopausal bleeding	6	7.50%
Lower abdominal pain	8	10.00%
Infertility	4	5.00%
Secondary amenorrhea	2	2.50%
Total	80	100%

Table 3 shows the distribution of Pap smear findings according to the Bethesda System among 80 study participants. The majority of cases were reported as NILM (normal/inflammatory), accounting for 50 cases (62.50%), indicating that most women had no evidence of epithelial abnormalities. Among abnormal findings, ASC-US was observed in 10 cases (12.50%), followed by LSIL in 8 cases (10.00%) and HSIL in 6 cases (7.50%), reflecting a gradual decrease in severity but clinically important

proportions of precancerous lesions. Glandular abnormalities were relatively rare, seen in only 2 cases (2.50%). Additionally, 4 smears (5.00%) were deemed inadequate for evaluation. Overall, the findings suggest that while the majority of smears were negative, a considerable proportion (approximately 32.5%) showed epithelial abnormalities, highlighting the importance of Pap smear screening for early detection of precancerous lesions.

Cytological Findings	Frequency (n)	Percentage (%)
NILM (Normal/Inflammatory)	50	62.50%
ASC-US	10	12.50%
LSIL	8	10.00%
HSIL	6	7.50%
Glandular abnormalities	2	2.50%
Inadequate smear	4	5.00%
Total	80	100%

Table 4 shows the association between age group and Pap smear findings (excluding inadequate smears, n = 76). It was observed that the majority of normal (NILM) findings were seen in the younger age groups, particularly 21–25 years (18 cases) and 26–30 years (14 cases). However, the proportion of abnormal findings (ASC-US/LSIL/HSIL/others) increased progressively with age. In the 21–25 age group, only 3 abnormal cases were reported,

whereas in 26–30 and 31–35 age groups, abnormal cases increased to 5 each. A notable rise was observed in the 36–40 age group (5 abnormal cases out of 11) and was highest in women aged >40 years, where abnormal findings (8 cases) exceeded normal cases (4 cases). Overall, out of 76 cases, 50 were normal and 26 were abnormal, indicating that the risk of epithelial abnormalities increases with advancing age.

Table 4: Association Between Age Group and Pap Smear Findings (Excluding Inadequate Smears, n = 76)

Age Group (years)	Normal (NILM)	Abnormal (ASC-US/LSIL/HSIL/Others)	Total
21–25	18	3	21
26–30	14	5	19
31–35	8	5	13
36–40	6	5	11
>40	4	8	12
Total	50	26	76

Table 5 presents the distribution of colposcopy and biopsy findings among abnormal cases (n = 26). The majority of cases were diagnosed as CIN I, accounting for 34.60% (n = 9), indicating that low-grade lesions were the most prevalent among the study population. Normal or benign findings were observed in 23.10% (n = 6) of cases, suggesting that a considerable proportion did not have significant pathology upon further evaluation. Higher-grade lesions,

including CIN II and CIN III, constituted 19.20% (n = 5) and 15.40% (n = 4) respectively, reflecting a notable presence of moderate to severe dysplasia. Importantly, carcinoma cervix was identified in 7.70% (n = 2) of cases, highlighting the detection of invasive disease in a small but clinically significant proportion. Overall, the findings indicate a predominance of low-grade lesions, with a progressive decline in frequency as lesion severity increases.

Table 5: Colposcopy and Biopsy Findings Among Abnormal Cases (n = 26)

Findings	Frequency (n)	Percentage (%)
Normal/Benign	6	23.10%
CIN I	9	34.60%
CIN II	5	19.20%
CIN III	4	15.40%
Carcinoma cervix	2	7.70%
Total	26	100%

Discussion

The present study findings are largely consistent with previous research on cervical cytology and reinforce the crucial role of Pap smear in the early detection of precancerous lesions. Our research results indicate that younger women between 21 and 30 years old more frequently visited healthcare facilities than women in other age brackets. Older age groups showed more frequent abnormal cytological results which occurred most commonly in individuals aged 40 and above. Sawaya et al. (2000) [11] observed that women aged 41 to 50 years showed the most abnormal Pap smear results while women aged 31 to 40 years showed the second highest results. The younger age group shows higher attendance rates at medical facilities whereas older women show more abnormality rates this finding exposes a major problem because high-risk age groups do not participate in screening programs. Koutsky et al. (1992) [12] explained that cervical epithelial

abnormalities develop during multiple years which supports our study finding that higher age results in greater lesion occurrence.

The study found that vaginal discharge was the most frequent complaint because people came to the hospital with abnormal bleeding. The results match the findings of Fonck et al. (2000) [13], who documented that about 35–40% of women who went for screening had vaginal discharge. Studies have shown that discharge appears as the most common symptom which people experience when they have inflammatory and precancerous cervical conditions. The study found that our research indicated post-coital bleeding and intermenstrual bleeding as warning signs which global studies report should be considered when diagnosing cervical pathology. The two symptoms show matching characteristics which demonstrate that organizations should use symptom-based screening methods in areas with limited resources.

The study results showed that most cases were identified as NILM while a small number of cases showed clinically significant epithelial abnormalities through ASC-US and LSIL and HSIL testing. The study results show Fonck et al. (2000) reported 8.48% of women who underwent screening developed epithelial cell abnormalities. The study by Sawaya et al. (2000) found LSIL occurred in 4.35% of cases while HSIL occurred in 1.02% of cases and ASC-US occurred in 2.3% of cases. The pattern of low-grade lesions being more common than high-grade lesions persists through different studies despite varying percentage results. Most women who present their cases to medical professionals show early-stage disease which makes treatment options more effective. Research in populations with restricted screening access has found that advanced lesions occur at higher rates because patients receive delayed diagnoses (Quinn et al. 1999) [14].

The study discovered that there exists a rising pattern of unusual cytological results which occurs as people grow older. Women above 40 years demonstrated a higher proportion of epithelial abnormalities compared to younger age groups. This disease progresses according to the natural progression of cervical cancer which begins with persistent infection from high-risk human papillomavirus (HPV) and advances through gradual development of low-grade lesions into high-grade lesions. Ley et al. (1991) [15] demonstrate that women who experience multiparity together with HPV infection will acquire cervical epithelial transformation through their extended duration of risk factor exposure. The consistency of these findings across studies shows that screening needs to be prioritized for women who are 30 years old or older.

Our study found that colposcopic and histopathological tests identified most abnormal cases as CIN I, which was followed by CIN II, CIN III, and a small number of invasive carcinoma cases. This distribution matches the results of previous studies, which found that most cases of low-grade lesions were the most common medical abnormalities that were detected. The study by Dvorak et al. (1999) [16] showed that most LSIL cases had CIN I result on biopsy, while only a small number of cases developed into more advanced lesions or invasive cancer. Our study found a lower number of CIN II and CIN III and carcinoma cases because our research successively identified patients through opportunistic screening, which helped us identify cancer in its early stage. The existence of carcinoma cases demonstrates that cervical cancer remains a significant public health issue, which requires ongoing systematic screening programs.

The research discovered common instances of inflammatory tissue changes which matched earlier studies. Studies have reported inflammation in approximately 40–45% of Pap smear samples which

often occurs together with chronic infections (Fonck et al. (2000)). The medical community considers ongoing inflammation to be a contributing factor for cervical cancer development because it supports human papillomavirus (HPV) persistence and leads to abnormal cell development. The research findings demonstrate that infection treatment and genital cleanliness maintenance work together to decrease the likelihood of developing cervical abnormalities.

The overall findings of our study match worldwide studies which show that Pap smear functions as an effective primary screening method. Anttila et al. (1999) [17] demonstrated that early cancer detection through cytological screening reduces both cervical cancer-related health problems and death rates. Quinn et al. (1999) showed that countries which implement effective screening programs experience significant drops in both cervical cancer cases and death rates. Developing nations still struggle with high health burdens because their populations lack proper screening access and information about screening processes.

Our study shows lower high-grade lesion rates than other studies because our research used earlier diagnosis methods and studied younger participants while study members had better understand of their condition. The presence of precancerous lesions across different age groups shows that all people carry some level of cancer risk. Williams et al. (1998) [18] emphasized the importance of health literacy and community awareness in improving participation in screening programs. The Indian context requires special attention because sociocultural barriers prevent people from accessing necessary healthcare services at appropriate times.

The current study results match existing research but show slight differences in prevalence rates. The research findings become more trustworthy because the study shows consistent results across multiple low-grade lesion groups which match age-related changes and typical medical symptoms. The different rates of advanced lesions between two groups show how healthcare access and public knowledge and screening methods vary between different communities. The evidence shows that regular Pap smear screening together with early diagnosis and proper follow-up procedures functions as the primary method to decrease cervical cancer cases.

Conclusion

The present study highlights the significant role of cervical cytology as an effective and practical tool for the early detection of precancerous lesions. The findings demonstrate that although the majority of participants had normal cytology, a considerable proportion exhibited epithelial abnormalities, emphasizing the need for routine screening. The increasing prevalence of abnormal findings with advancing age further underlines the importance of

targeted screening, particularly among women above 30–40 years. The predominance of low-grade lesions and limited cases of invasive carcinoma suggest that timely detection through Pap smear can prevent disease progression. Additionally, common symptoms such as vaginal discharge and abnormal bleeding should not be overlooked, as they may indicate underlying pathology. Overall, strengthening awareness, improving accessibility to screening services, and ensuring timely follow-up can substantially reduce the burden of cervical cancer and improve women's health outcomes.

References

1. Marks JS, Lee NC, Lawson HW, Henson R, Bobo JK, Kaeser MK. Implementing recommendations for the early detection of breast and cervical cancer among low-income women. *Morbidity and Mortality Weekly Report*. 2000 Mar 31;49:35-55.
2. Symonds RP. Screening for cervical cancer: different problems in the developing and the developed world. *European Journal of Cancer Care*. 1997 Dec;6(4):275-9.
3. Symonds RP. Screening for cervical cancer: different problems in the developing and the developed world. *European Journal of Cancer Care*. 1997 Dec;6(4):275-9.
4. Parkin D, Pisani P, Ferlay J. Estimates of the worldwide incidence of eighteen major cancers in 1985. *International journal of cancer*. 1993 Jun 19;54(4):594-606.
5. Bishop A, Wells E, Sherris J, Tsu V, Crook B. Cervical cancer: evolving prevention strategies for developing countries. *Reproductive Health Matters*. 1995 Jan 1;3(6):60-71.
6. Wright AS, Richards-Kortum R, Hong WK. Cervical human papillomavirus infection and intraepithelial neoplasia: a review. *Journal of the National Cancer Institute: Monographs*. 1990(21):17.
7. Bauer HM, Rodriguez MA, Quiroga SS, Flores-Ortiz YG. Barriers to health care for abused Latina and Asian immigrant women. *Journal of health care for the poor and underserved*. 2000;11(1):33-44.
8. Marcus AC, Crane LA, Kaplan CP, Reading AE, Savage E, Gunning J, Bernstein G, Berek JS. Improving adherence to screening follow-up among women with abnormal Pap smears: results from a large clinic-based trial of three intervention strategies. *Medical care*. 1992 Mar 1;30(3):216-30.
9. Miller AB, World Health Organization. Cervical cancer screening programmes: managerial guidelines. World Health Organization; 1992.
10. Sherman ME, Schiffman MH, Strickler H, Hildesheim A. Prospects for a prophylactic HPV vaccine: rationale and future implications for cervical cancer screening. *Diagnostic cytopathology*. 1998 Jan;18(1):5-9.
11. Sawaya GF, Kerlikowske K, Lee NC, Gildengorin G, Washington AE. Frequency of cervical smear abnormalities within 3 years of normal cytology. *Obstetrics & Gynecology*. 2000 Aug 1;96(2):219-23.
12. Koutsky LA, Holmes KK, Critchlow CW, Stevens CE, Paavonen J, Beckmann AM, DeRouen TA, Galloway DA, Vernon D, Kiviat NB. A cohort study of the risk of cervical intraepithelial neoplasia grade 2 or 3 in relation to papillomavirus infection. *New England journal of medicine*. 1992 Oct 29;327(18):1272-8.
13. Fonck K, Kidula N, Jaoko W, Estambale B, Claeys P, Ndinya-Achola J, Kirui P, Bwayo J, Temmerman M. Validity of the vaginal discharge algorithm among pregnant and non-pregnant women in Nairobi, Kenya. *Sexually transmitted infections*. 2000 Feb 1;76(1):33-8.
14. Quinn M, Babb P, Jones J, Allen E. PapersEffect of screening on incidence of and mortality from cancer of cervix in England: evaluation based on routinely collected statistics. *Bmj*. 1999 Apr 3;318(7188):904.
15. Ley C, Bauer HM, Reingold A, Schiffman MH, Chambers JC, Tashiro CJ, Manos MM. Determinants of genital human papillomavirus infection in young women. *JNCI: Journal of the National Cancer Institute*. 1991 Jul 17;83(14):997-1003.
16. Dvorak KA, Finnemore M, Maksem JA. Histology correlation with atypical squamous cells of undetermined significance (ASCUS) and low-grade squamous intraepithelial lesion (LSIL) cytology diagnoses: an argument to ensure ASCUS follow-up that is as aggressive as that for LSIL. *Diagnostic cytopathology*. 1999 Oct;21(4):292-5.
17. Anttila A, Pukkala E, Söderman B, Kallio M, Nieminen P, Hakama M. Effect of organised screening on cervical cancer incidence and mortality in Finland, 1963–1995: recent increase in cervical cancer incidence. *International journal of cancer*. 1999 Sep 24;83(1):59-65.
18. Williams MV, Baker DW, Parker RM, Nurss JR. Relationship of functional health literacy to patients' knowledge of their chronic disease: a study of patients with hypertension and diabetes. *Archives of internal medicine*. 1998 Jan 26;158(2):166-72.