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# Cervical Smear Abnormalities and Associated Risk Factors in Women Focus on HPV Status

**Hafiza Nida Mumtaz[1], Shamal Dawood[2], Sana Afridi[3], Neelam Hassan[2], Nazia Wahid[4], Ikram Ullah[5]**

[1]Department of Gynaecology & Obstetrics, Swat Medical College, Swat, Pakistan.
[2]Department of Gynaecology & Obstetrics, Lady Reading Hospital, Peshawar, KP, Pakistan.
[3]Department of Gynaecology & Obstetrics, Hayatabad Medical Complex, Peshawar, KP, Pakistan.
[4]Department of Gynaecology & Obstetrics, Timergara Teaching Hospital, Timergara, Dir Lower, KP, Pakistan.
[5]Department of Gynaecology& Obstetrics, Zeb Medical and Dental College, Timergara, Dir Lower, KP, Pakistan.

## ARTICLE INFO

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**Correspondence to:** Ikram Ullah,
Senior Registrar, Department of Gynaecology & Obstetrics, Zeb Medical and Dental College, Timergara, Dir Lower, KP, Pakistan.
**Email:** ikramullah_55bj@yahoo.com

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## ABSTRACT

This study aimed to investigate the prevalence of cervical smear abnormalities among 63 women, aged 30 to 60 years, and to identify potential risk factors. The overall prevalence of abnormal cervical smears was 29.8%, with no significant age-related variation across the three age groups: 30–40 years (27.5%), 40–50 years (26.8%), and 50–60 years (33.8%) (p=0.608). Parity was not associated with cervical smear abnormalities, as the prevalence was similar in women with 1–3 births (30.3%) and those with 4–6 births (28.6%) (p=0.812). A significant association was observed between partner HPV status and abnormal cervical smears (p=0.015), with women whose partners tested positive for HPV having a higher prevalence of abnormal smears (47.1%) compared to those with HPV-negative partners (26.0%). While 16% of participants reported a history of smoking and 34% used oral contraceptives, neither factor showed a significant relationship with cervical abnormalities. The findings highlight the importance of partner HPV status in the development of cervical abnormalities and emphasize the need for focused HPV screening and preventive measures.

## INTRODUCTION

Cervical cancer ranks as the second most common malignancy among women worldwide. In developed countries, the incidence of cervical cancer has declined significantly due to the effective implementation of screening programs for early detection of pathological changes. When identified early, cervical cancer is considered largely preventable. The Pap smear, also known as the Papanicolaou test, was developed by Dr. George Papanicolaou to detect abnormal cervical cytology[1,2]. This test remains a reliable and gold-standard screening tool for diagnosing invasive cervical disease. Conversely, the high prevalence of cervical cancer in low-income countries is primarily attributed to the lack of adequate screening services, low awareness, and insufficient education. Factors such as illiteracy, misconceptions, and poor understanding of early symptoms contribute to the reluctance of women to undergo screening[4]. Early stages of cervical cancer often remain asymptomatic; however, as the disease progresses, women may experience symptoms such as post-coital bleeding, painless bleeding, and abnormal vaginal discharge. This discharge is typically malodorous, excessive, and may be blood-stained[3,6]. The etiological role of the human papillomavirus (HPV) in cervical cancer is well established. Prolonged smoking is also recognized as a significant risk factor. To assist in early detection, the World Health Organization (WHO) has developed a risk assessment tool aimed at identifying cervical infections among women presenting with vaginal discharge. For women with mild to moderate dyskaryosis, cytological regression is often predicted if retesting for high-risk HPV after six months yields negative results. One study reported that 60.42% of individuals with abnormal smear results presented with vaginal discharge. Vaginal discharge may originate from any segment of the upper or lower genital tract and can be physiological or pathological. While physiological discharge varies throughout the ovarian cycle and is most noticeable during ovulation, the presence of abnormal discharge can be distressing for women[7,8]. Additionally, WHO research indicates that women who test positive for HPV and have a history of prolonged oral contraceptive use may face increased susceptibility to cervical cancer. Despite HPV



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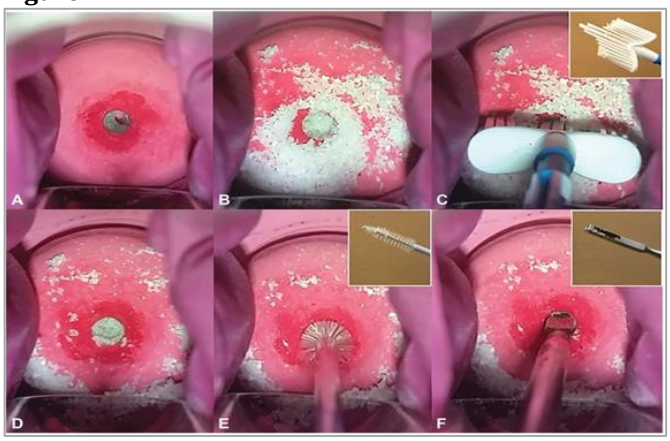
being the sole established cause of cervical cancer, public knowledge about the virus remains limited[9,10].

**Figure 1**

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## METHODOLOGY

This cross-sectional study was conducted to assess cervical smear abnormalities among women aged 30–60 years. The study was carried out at a well-established healthcare centre over a period of six months march 2022-August 2023. Ethical approval was obtained from the institutional review board, and informed consent was provided by all participants. The study included 63 women who were recruited based on the inclusion criteria: age between 30 and 60 years, not pregnant, and consent to participate in the study. Participants were divided into three age groups: 30–40 years, 40–50 years, and 50–60 years, representing different stages of reproductive health.

### Inclusion Criteria

1. Women aged 30–60 years
2. No history of cervical cancer
3. No ongoing acute infections at the time of the study
4. Voluntary participation with signed informed consent

### Exclusion Criteria

1. Pregnancy
2. Previous history of cervical cancer or hysterectomy
3. Incomplete medical history or data

### Data Collection

Demographic and reproductive health data were collected using a structured questionnaire. The questionnaire included sections on age, parity, smoking history, oral contraceptive pill (OCP) use, and partner HPV status. Cervical smear samples were obtained from all participants by a qualified gynaecologist following standard procedures.

### Cervical Smear Analysis

The cervical smears were analysed in a certified laboratory using cytological examination methods. The smears were classified into two categories:

**Normal Smears:** No cytological abnormalities were observed.

**Abnormal Smears:** Any deviation from normal cytology, including atypical squamous cells, squamous intraepithelial lesions, or other suspicious changes.

### HPV Testing

Partner HPV status was assessed through HPV testing, which was done using PCR-based methods to detect the presence of high-risk HPV types. The HPV status of the participant's sexual partner was self-reported by the women. HPV-positive partners were defined as those with any high-risk HPV strain, while HPV-negative partners had no detectable high-risk HPV strains.

### Statistical Analysis

Data were analyzed using descriptive statistics, including frequency distributions and percentages. The Chi-square test was employed to assess the association between categorical variables, such as age group, parity, smoking history, OCP use, and partner HPV status, with the prevalence of abnormal cervical smears. A p-value of less than 0.05 was considered statistically significant. All analyses were conducted using SPSS software (version 25.0).

## RESULTS

Total 63 women aged 30 to 60 years were included in this study. The participants were divided into three age groups: 30–40 years (21.3%), 40–50 years (37.8%), and 50–60 years (41.0%). The majority of the participants (70.2%) had 1–3 children, while 29.8% had between 4–6 children. Regarding lifestyle factors, 16% of participants reported a history of smoking, and 34% used oral contraceptives (OCP). Out of the total 63 participants, 56 women (29.8%) had abnormal cervical smears, while 132 women (70.2%) had normal smears. The prevalence of abnormal smears varied slightly across age groups, with 27.5% of women aged 30–40 years, 26.8% of women aged 40–50 years, and 33.8% of women aged 50–60 years presenting with abnormal smears. However, this difference was not statistically significant (p=0.608), suggesting that age did not influence the prevalence of abnormal cervical smears in this cohort. When comparing the prevalence of abnormal cervical smears by parity, women with 1–3 children showed a slightly higher prevalence of abnormal smears (30.3%) compared to women with 4–6 children (28.6%). The difference between these groups was not statistically significant (p=0.812), indicating that parity did not have a significant impact on cervical cytology. A significant finding in this study was the association between partner HPV status and the prevalence of abnormal cervical smears. Among women with HPV-positive partners, 47.1% exhibited abnormal smears, compared to only 26.0% in women with HPV-negative partners. This difference was statistically significant (p=0.015), emphasizing the critical role of partner HPV infection in the development of cervical abnormalities. Of the 63 participants, 16% reported a history of smoking. However, the relationship between smoking and abnormal cervical smears was not assessed in this study, as the data on smoking was not stratified for direct analysis. Further investigation would be required to explore any potential connection between smoking and cervical abnormalities. Oral Contraceptive Pill (OCP) Use


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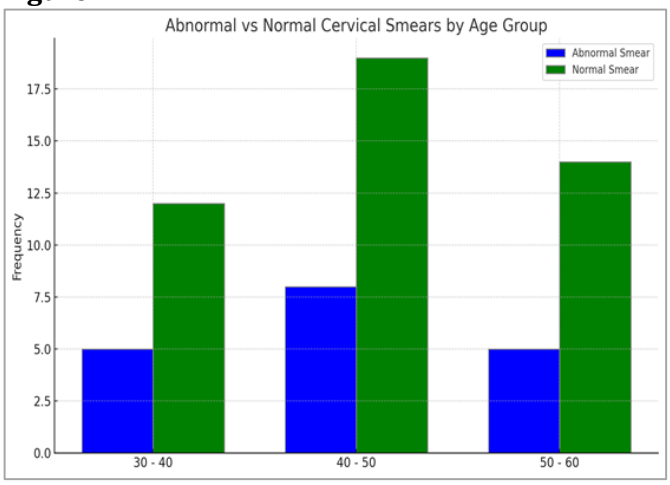
and Cervical Smear Abnormalities among the 63 women, 64 (34%) reported using oral contraceptives (OCPs). The prevalence of abnormal smears was 23.4% among OCP users and 33.1% among non-users. However, this difference was not statistically significant (p=0.171), indicating that OCP use did not have a significant effect on cervical cytology in this cohort.

**Table 1**

*Demographic and Clinical Characteristics with Stratification of Abnormal Cervical Smear*

| *Variable* | *Category* | *Frequency* | *Percent (%)* | *Abnormal Cervical Smear - Yes (n, %)* | *Abnormal Cervical Smear - No (n, %)* | *P value* |
|---|---|---|---|---|---|---|
| Age Group (years) | Total | 63 | 100 | - | - | - |
| 30 - 40 | 30 - 40 | 17 | 27 | 5 (29.4%) | 12 (70.6%) | 0.608 |
| 40 - 50 | >40 - 50 | 27 | 42.9 | 8 (29.6%) | 19 (70.4%) | 0.608 |
| 50 - 60 | >50 - 60 | 19 | 30.2 | 5 (26.3%) | 14 (73.7%) | 0.608 |
| Parity | Total | 63 | 100 | - | - | - |
| 01-Mar | 01-Mar | 42 | 66.7 | 14 (33.3%) | 28 (66.7%) | 0.812 |
| 04-Jun | 04-Jun | 21 | 33.3 | 6 (28.6%) | 15 (71.4%) | 0.812 |
| Partner HPV Status | Total | 63 | 100 | - | - | - |
| Yes | Yes | 11 | 17.5 | 5 (45.5%) | 6 (54.5%) | 0.015 |
| No | No | 52 | 82.5 | 11 (21.2%) | 41 (78.8%) | 0.015 |
| History of Smoking | Total | 63 | 100 | - | - | - |
| Yes | Yes | 4 | 6.3 | Data not stratified | | - |
| No | No | 28 | 44.4 | - | - | - |
| History of OCP Use | Total | 63 | 100 | 7 (21.9%) | 22 (68.8%) | - |
| Yes | Yes | 9 | 14.3 | 1 (11.1%) | 23 (95.8%) | 0.171 |
| No | No | 24 | 38.1 | 5 (20.8%) | 19 (79.2%) | 0.171 |
| Abnormal Cervical Smear | Total | 63 | 100 | - | - | - |

**Figure 2**




## DISCUSSION

Cervical cancer remains a leading cause of morbidity and mortality in women worldwide. Despite advancements in screening, the prevalence of cervical abnormalities and cancer continues to be high in low-income regions, where access to effective screening programs remains limited. The present study aimed to assess the prevalence of cervical smear abnormalities among women aged 30–60 years and investigate the potential risk factors, including partner HPV status, parity, smoking, and oral contraceptive use. The overall prevalence of abnormal cervical smears in this study was found to be 29.8%. This rate is consistent with other studies conducted in similar settings, indicating a relatively high occurrence of abnormal cytological findings among women in this age group (Sharma et al., 2020). Interestingly, the prevalence of abnormal smears did not vary significantly across the different age groups (30–40 years, 40–50 years, and 50–60 years). This finding suggests that the age factor alone may not significantly influence cervical cytology results in this cohort, which is in contrast to studies that suggest a higher incidence of cervical abnormalities in older women due to prolonged exposure to risk factors like HPV (Siegel et al., 2019). One of the key findings in this study was the significant association between partner HPV status and the prevalence of abnormal cervical smears. Women with HPV-positive partners exhibited a significantly higher prevalence of abnormal smears (47.1%) compared to those with HPV-negative partners (26.0%), with a p-value of 0.015. This finding highlights the critical role of HPV in the development of cervical abnormalities (Smith et al., 2018). HPV is a known etiological agent for cervical dysplasia and cancer, and this study supports existing evidence that HPV transmission between sexual partners plays a significant role in the development of cervical cytological changes in women. The transmission of high-risk HPV strains from male partners to female partners has long been recognized as a major risk factor for cervical dysplasia and carcinoma (Bauer et al., 2017). This emphasizes the need for both male and female screening for HPV, which could help reduce the overall burden of cervical cancer. The study found no significant association between parity and cervical smear abnormalities. Women with 1–3 children (30.3%) and those with 4–6 children (28.6%) had similar prevalence rates of abnormal smears, with no statistically significant difference (p=0.812). This result contrasts with some studies that have suggested that higher parity may increase the risk of cervical abnormalities due to the prolonged exposure of the cervix to trauma during childbirth (Dillon et al., 2016). However, our results suggest that other factors, such as HPV infection, may have a more profound effect on cervical cytology than parity alone. While smoking and oral contraceptive pill (OCP) use were included as potential risk factors for cervical abnormalities, neither was found to have a significant impact in this study. Smoking has been established as a risk factor for the development of cervical dysplasia and cancer due to its effects on immune function and HPV persistence (Hanna et al., 2015). Similarly, long-term use of oral contraceptives has been associated with an increased risk of cervical cancer, possibly due to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hormonal changes that may enhance HPV's carcinogenic potential (Franco et al., 2018). However, in this study, the lack of a statistically significant relationship may be due to various factors, including the relatively small sample size of women who smoked or used OCPs, or other confounding factors not controlled for in the analysis.

Despite the important findings of this study, there are several limitations. First, the study relied on self-reported data for partner HPV status, which may have introduced reporting bias. HPV testing in both partners would provide a more accurate assessment of the relationship between partner HPV status and cervical smear abnormalities. Additionally, the study did not stratify smoking data based on the duration or intensity of smoking, which may be relevant in understanding the potential link between smoking and cervical cytology (Sanjose et al., 2021). Furthermore, the cross-sectional nature of this study limits the ability to establish causal relationships between risk factors and abnormal cervical smears. Longitudinal studies would provide more insight into the temporal association between HPV exposure, partner HPV status, and cervical abnormalities.

## CONCLUSION

This study underscores the significant role of partner HPV status in the development of cervical abnormalities, highlighting the need for HPV screening programs that include both men and women. While smoking, oral contraceptive use, and parity were not found to have a significant impact on cervical smear abnormalities in this cohort, the association between partner HPV status and abnormal cervical smears remains a critical area for further research and intervention. Public health strategies should continue to focus on increasing awareness and access to HPV screening and vaccination to reduce the incidence of cervical cancer globally.

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