A CERVICAL PAP SMEAR CYTOLOGY PATTERN OBSERVED IN AN INDIAN TERTIARY CARE HOSPITAL: A RETROSPECTIVE CROSS-SECTIONAL STUDY.

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Abstract

Objective
The objective of this study is to ascertain the prevalence of carcinoma cervix, non-neoplastic lesions, and premalignant lesions among patients exhibiting diverse clinical manifestations in the gynaecology outpatient setting.

Materials and Methods
The current investigation entailed a retrospective cross-sectional analysis of cervical smears obtained from individuals aged 21 years or above, with a study duration spanning one year. The conventional Pap smears underwent analysis, and the subsequent findings were duly documented.

Results
Out of the 1200 cases with satisfactory smears that were examined, 800 of them showed benign and inflammatory lesions, while 400 cases displayed epithelial lesions, which included premalignant and malignant lesions. Among a group of 400 individuals demonstrating epithelial lesions, a category of 150 cases was identified as ASCUS. Furthermore, a relatively limited group which includes 90 cases was classified as AGUS or an AGC-NOS.

Conclusion
Cervical cancer stands as the foremost etiological factor contributing to mortality associated with cancer in the female population. However, the incidence of this condition can be mitigated through the implementation of routine pap smear examinations aimed at early identification. A simple and affordable screening method that may be easily carried out at the main medical facility is the Pap smear test.

Recommendation
Encourage the establishment and promotion of regular screening programs, especially targeting populations at higher risk. Emphasize the importance of routine Pap smear tests for women, stressing the potential benefits of early detection and treatment.

Introduction

The first person to underline that advanced cancer starts in a preinvasive stage was Papanicolaou (1928) [1]. It was widely accepted in the 1940s that invasive cancer frequently occurs several years after preinvasive cervix problems. Cervical smear screenings can detect these abnormalities [2]. Early detection of premalignant cervical lesions through Pap smear screening can significantly reduce mortality rates associated with cervical cancer. The uterine cervix is an optimal choice for screening since it allows for convenient accessibility for exfoliative cytology or pap smear testing [3]. The Papanicolaou (Pap) smear quickly became the established method for screening cervical cancer and precancerous conditions. The five-year comparative survival rate stands at roughly 46%, much below the rates observed in other countries. The primary reason for this is the frequent detection of cervical cancer at an advanced stage, accounting for around 80% of cases [4].

On the other hand, early detection of precancerous growths in the cervix with appropriate cervical smear screening can lower the death rate linked to cervical cancer [5]. It is possible to identify and avoid cervical cancer easily. Both liquid-based cytology and classic pap smear screening procedures are considered appropriate approaches for cervical cancer screening [6, 7]. The pap smear test demonstrates an overall sensitivity ranging from 70% to 80% for identifying an elevated level squamous intraepithelial lesion (HSIL). The sensitivity of the Pap smear test is enhanced when it is paired with

human papillomavirus (HPV)-DNA testing. Multiple studies have demonstrated a decrease in the occurrence of invasive cervical cancer and associated deaths as a result of the early diagnosis of cervical intraepithelial lesions using pap smear screening [8, 9].

The current study set out to determine the incidence of non-neoplastic lesions, premalignant tumors, and cervical cancer among the participants throughout the research.

Materials and Methods
Study design
A retrospective cross-sectional study

Study setting
The study was conducted at the Department of Pathology, Patna Medical College and Hospital in Patna, Bihar, India, from a time duration of January 2022 to December 2023, gathered all traditional Pap smears for routine screening.

Participants
The study comprised individuals aged 21 years or above who sought medical attention due to symptoms such as vaginal discharge, bleeding after sexual intercourse, bleeding between menstrual periods, bleeding after menopause, and abdominal pain. However, the study excluded those who were getting medical attention for the disease. Pregnant individuals were excluded as well.

Following the application of these criteria, 1500 instances in total were included in the analysis.

Analysis procedure
Papanicolaou's technique was used to dye the cytology smears after they had been treated with 95% isopropyl alcohol. The updated 2001 Bethesda reporting standards had performed the smear examination.

Bias
There was a chance that bias would arise when the study first started, but we avoided it by giving all participants identical information and hiding the group allocation from the nurses who collected the data.

Statistical analysis
The data obtained from the study was arranged in a tabulated manner in an Excel sheet, and the data was then subjected to statistical analysis. Statistical analysis is accomplished using an appropriate software program (e.g., SPSS).

Ethical considerations
The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

Results

Table 1: Socio-demographics of study participants

Socio-demographic characteristics	Percentage
Age group (years)	
21-30	15.67%
31-40	31.92%
41-50	29.00%
51-60	11.92%
Above 60	6.50%
Parity distribution	
Nulliparous	12.33%
Primipara	23.17%
Multipara	61.50%
Education level	
Uneducated	42.33%
Matric	28.17%
Higher secondary	9.83%
Graduate	15.67%
Marital status	
Married	100%
Unmarried	--
Contraception usage	
None	33.17%
Barrier	54.42%
Tubal ligation	6.50%
OCP	1.92%

1500 occurrences were analyzed for this study, and 300 of those cases included material that was deemed unsuitable or insufficient. Therefore, the Bethesda method of report deemed the rest of the 1200 cases satisfactory. A total of

800 patients had non-neoplastic pathology and were found to be malignant or to have NILM (Table 2).

Table 2: Results of Pap smear

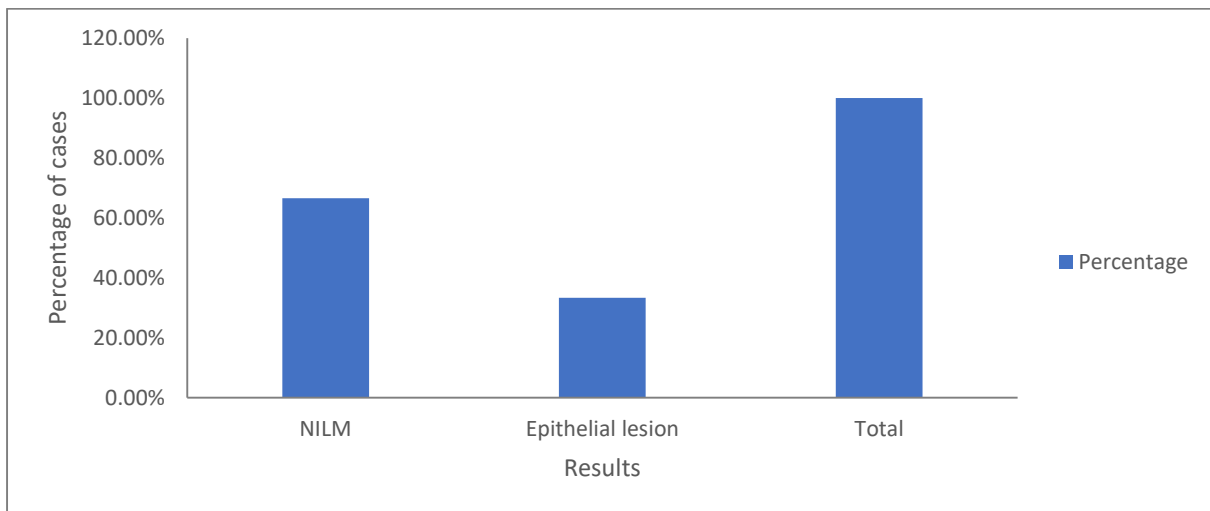| Results	Cases	Percentage
NILM	800	66.6%
Epithelial lesion	400	33.3%
Total	1200	100%

Figure 1: Results of Pap smear

400 cases of malignancies were classified; 150 were classified as ASCUS, and 90 as AGUS or AGC-NOS. Out of the total number of cases, 70 cases showed signs of LSIL and 60 cases showed signs of HSIL. 20 instances showed cytologic characteristics suggestive of SCC, while 10 cases showed characteristics suggestive of an adenocarcinoma (Table 3).

Table 3: Epithelial lesion frequency

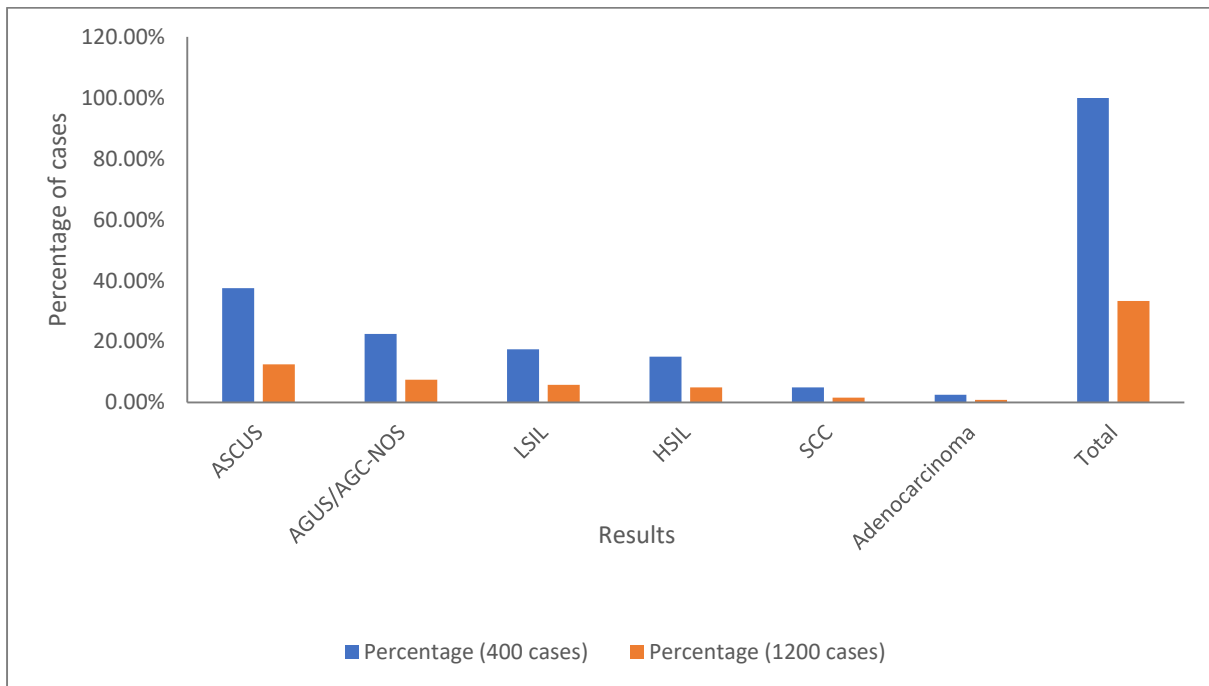| Results	Cases	Percentage (400 cases)	Percentage (1200 cases)
ASCUS	150	37.5%	12.5%
AGUS/AGC-NOS	90	22.5%	7.5%
LSIL	70	17.5%	5.8%
HSIL	60	15%	5%
SCC	20	5%	1.6%
Adenocarcinoma	10	2.5%	0.8%
Total	400	100%	33.3%

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Figure 2: Epithelial lesion frequency

A total of 800 cases were documented with non-neoplastic pathology, which means that there was no NILM present. Of them, 350 cases had non-specific pathological conditions, 200 cases had bacterial vaginosis features, 100 cases showed repair modifications, 60 cases had candida infection symptoms, 50 cases had trichomonas, 20 cases had atrophic changes, and 20 cases had microfilaria (Table 4).

Table 4: Non-neoplastic pathology frequency

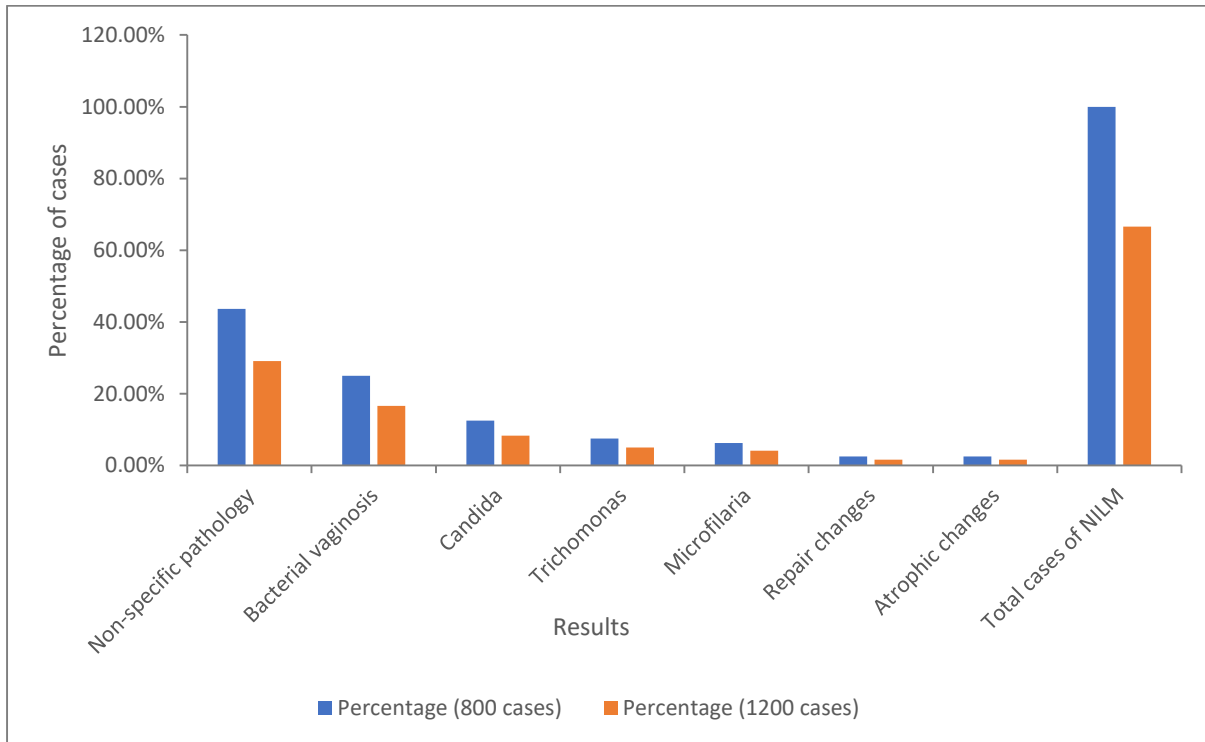| Results	Cases	Percentage (800 cases)	Percentage (1200 cases)
Non-specific pathology	350	43.7%	29.1%
Bacterial vaginosis	200	25%	16.6%
Candida	100	12.5%	8.33%
Trichomonas	60	7.5%	5%
Microfilaria	50	6.25%	4.16%
Repair changes	20	2.5%	1.66%
Atrophic changes	20	2.5%	1.66%
Total cases of NILM	800	100%	66.6%

Figure 3: Non-neoplastic pathology frequency

Among the cases of epithelial lesions, the majority were in the age range of 31-40 years, followed by the age group of 41-50 years. The majority of instances of high-grade squamous intraepithelial lesions (HSIL) were observed in individuals aged 41-50 years, while cases of squamous cell carcinoma (SCC) were predominantly seen in those aged 51-60 years.

The majority of NILM instances mostly affect the younger age group, specifically individuals between the ages of 21 and 30. Additionally, the age range of 31-40 years is also significantly affected.

(a)   (b)
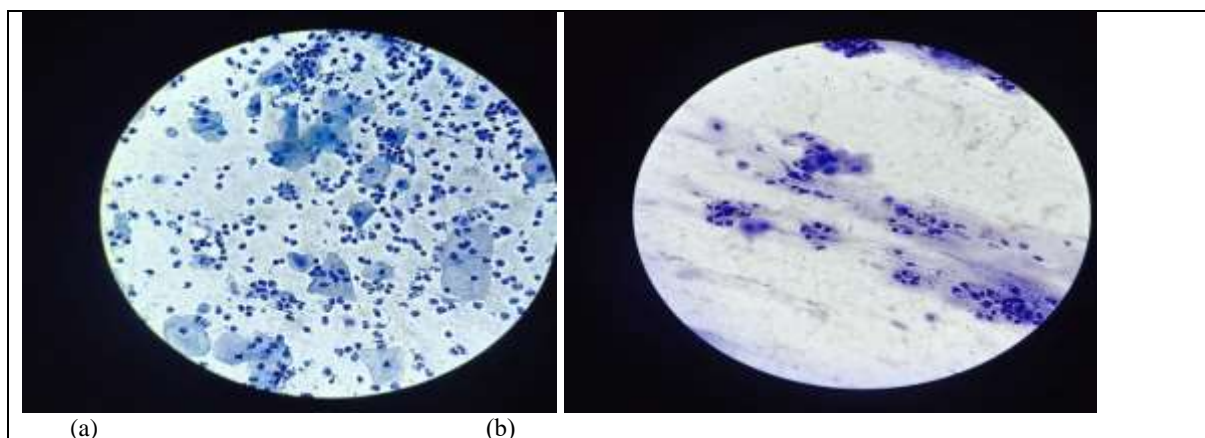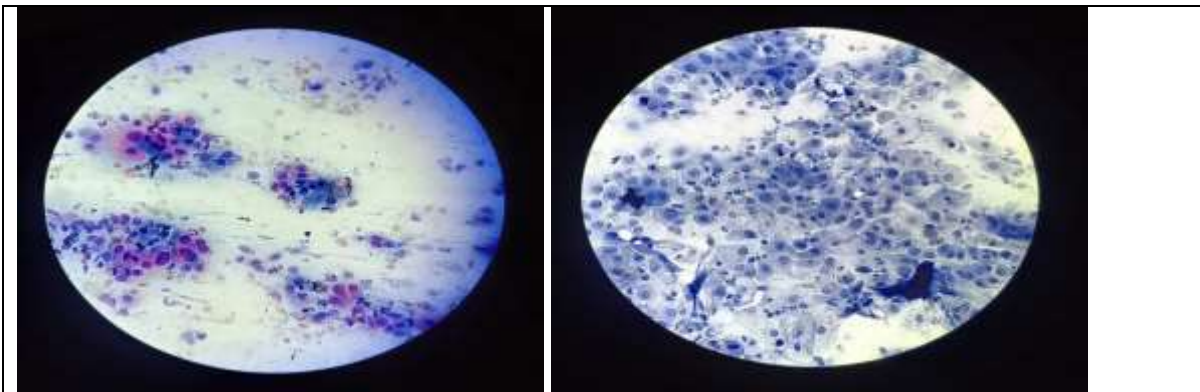
(c)   (d)

Figure 4: (a) Photomicrograph of negative for intraepithelial lesion or malignancy (NILM), 40x, (b) Photomicrograph of low grade squamous intraepithelial lesion (LSIL), 40x, (c) Photomicrograph of high grade squamous intraepithelial lesion (HSIL), 40x, (d) Photomicrograph of Atypical squamous cell of undetermined significance (ASCUS), 40x.

Discussion

In the current investigation, the predominant premalignant lesion identified was ASCUS, succeeded by LSIL and subsequently HSIL. It is worth noting that several studies [10-12] have reported a comparatively lower incidence of ASCUS. It is well recognized that ASCUS progresses progressively toward LSIL, HSIL, and SCC. The investigation also included two cases of AGUS and one case of adenocarcinoma. The patient's condition, AGUS, has advanced to adenocarcinoma. It is recommended that this test be conducted at regular intervals of every 3 years. Cervical carcinoma typically manifests in individuals aged 40 to 50 years, with its precursor lesion typically appearing 5 to 10 years before the onset of the carcinoma. The uterine cervix is an optimal site for screening purposes, primarily due to its convenient accessibility for exfoliative cytology or pap smear testing. Cervical cancer is known to be largely caused by HPV, a fact that has been well documented and investigated [10]. The utilization of Pap smear examination, in conjunction with HPV-DNA testing, has been found to enhance the sensitivity in the identification of cervical epithelial lesions with potential for precancerous development. The Pap smear test serves as an economically efficient screening technique that may be carried out at primary healthcare centers, while HPV-DNA testing is usually conducted at more sophisticated medical facilities. The pap smear examination is accepted as a routine procedure for the detection of cancer [11].

In the present investigation, a higher incidence of epithelial abnormalities was observed in the age cohort ranging from 31 to 40 years, followed by the age group spanning from 41 to 50 years and subsequently the age group encompassing 51 to 60 years. The majority of cases of squamous cell carcinoma (SCC) were observed within the age range of 51-60 years. This finding demonstrated a level of comparability similar to that observed in previous investigations. In a study conducted by Nair GG et al. [13], a significant prevalence of epithelial abnormalities was observed within the postmenopausal age group (51-60 years).

A study carried out by Pathak R et al. [14] found that 17.2% of the cases had bacterial vaginosis, whereas 8.9% of the cases were identified with Trichomonas infection. Within this investigation, a considerable percentage (37.9%) of smears categorized as being unfavorable for intraepithelial lesion or malignancy (NILM) displayed non-specific pathology. Bacterial vaginosis was the second most common result, which represented 22.14% of the patients [15].

Conclusion

Pap smear testing is an important diagnostic method for detecting precancerous cervical epithelial abnormalities. Studies have demonstrated that identifying and treating a condition at an early stage can greatly reduce the number of deaths. The Pap smear test is an extremely efficient and cost-effective screening procedure that may be easily performed at primary health centers.

Limitations

Cervical Pap smear cytology, although effective in detecting cervical abnormalities, had limitations. False negatives could occur due to sampling errors or inadequate cell collection. Subjectivity in interpreting results could lead to variations among pathologists. The test's sensitivity in detecting certain high-risk HPV strains was limited. Additionally, it could miss early-stage lesions or abnormalities, providing a false sense of security. Inconclusive results and the need for repeated testing could have caused anxiety. Despite its benefits, Pap smear cytology was not infallible and might have required complementary screening methods for comprehensive cervical cancer detection.

Recommendations

It is generally recommended to start at age 21 and undergo screening every 3 years until age 29. From age 30 to 65, options include Pap test alone every 3 years, HPV test alone every 5 years, or co-testing every 5 years. Vaccination against HPV is advised for adolescents. Consult with a healthcare professional for personalized screening plans.

Acknowledgment

List of Abbreviation

1. AGCNOS- Atypical glandular cells not otherwise specified
2. ASCUS- Atypical Squamous Cells of Undetermined Significance
3. HSIL- High-grade squamous intraepithelial lesion
4. HPV- Human papilloma virus
5. LSIL- Low-Grade Squamous Intraepithelial Lesion
6. NILM- Negative for intraepithelial lesion or malignancy
7. SSC- Squamous cell carcinoma

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Conflict of interest

The authors report no conflicts of interest in this work.

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