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Conventional Pap Smear Findings Among Gynecological Patients at Siloam Hospital West Jakarta, 2023-2025

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ABSTRACT

Introduction: Cervical cancer remains a major global health burden, and cervical screening is essential for detecting precancerous changes before invasive disease develops. This study aimed to describe conventional Pap smear cytology findings among gynecological patients at Siloam Hospital in West Jakarta during 2023-2025.
Method: A retrospective descriptive cross-sectional design was used. Medical records of all eligible female patients who underwent conventional Pap smear examinations during the study period were included through total sampling. Cytology was classified using the Bethesda reporting system and summarized as frequencies and percentages.
Results: A total of 4,178 examinations were analyzed. Negative for intraepithelial lesion or malignancy (NILM) was reported in 3,707 cases (88.73%). The most frequent abnormal category was atypical squamous cells of undetermined significance (ASC-US), with 455 cases (10.89%), followed by low-grade squamous intraepithelial lesion (LSIL) in 8 (0.19%), atypical squamous cells-cannot exclude HSIL (ASC-H) in 5 (0.12%), high-grade squamous intraepithelial lesion (HSIL) in 2 (0.05%), and atypical glandular cells (AGC) in 1 (0.02%). No invasive malignancy was documented.
Conclusion: Most examinations were NILM, while ASC-US accounted for nearly all abnormal cytology. High-grade abnormalities were uncommon. These findings provide a three-year institutional cytology profile that may support evaluation and planning of cervical screening services.

Keywords: Cervical cytology, conventional Pap smear, gynecological patients, screening

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Introduction

Cervical cancer remains an important cause of cancer-related morbidity and mortality among women, even though it is largely preventable through vaccination, screening, early diagnosis, and timely treatment. However, unequal access to preventive services, limited participation in screening, delayed follow-up, and differences in health-system capacity continue to sustain its global burden. Estimates from the Global Cancer Observatory for 2022 indicated approximately 661,000 new cervical cancer cases and 348,000 related deaths worldwide. These figures demonstrate that cervical cancer remains a serious public-health problem, particularly in settings where comprehensive prevention and early-detection programs have not been implemented equitably or consistently.[1]

In response to this burden, the World Health Organization (WHO) established a global strategy to eliminate cervical cancer as a public-health problem. The strategy is represented by the 90-70-90 targets for 2030: 90% of girls should be fully vaccinated against human papillomavirus (HPV) by 15 years of age, 70% of women should be screened using a high-performance test by the ages of 35 and 45 years, and 90% of women diagnosed with cervical precancer or invasive cancer should receive appropriate treatment.[2] Achieving these targets requires coordinated services across the continuum of care, including community education, vaccination delivery, accessible screening, accurate diagnosis, effective referral, and treatment completion.

Cervical cytology remains clinically useful in healthcare settings where conventional Pap smear examination is routinely performed. The procedure allows cervical epithelial cells to be evaluated microscopically for abnormalities that may indicate HPV-related changes, precancerous lesions, or malignancy. Its effectiveness depends on appropriate specimen collection, fixation, staining, slide preparation, microscopic interpretation, and communication of results. Standardized reporting is therefore essential for reducing variation and supporting consistent clinical management. The Bethesda System distinguishes specimens categorized as negative for intraepithelial lesion or malignancy (NILM) from epithelial cell abnormalities, including atypical squamous cells of undetermined significance (ASC-US), atypical squamous cells cannot exclude HSIL (ASC-H), low-grade squamous intraepithelial lesion (LSIL), high-grade squamous intraepithelial lesion (HSIL), and atypical glandular cells (AGC).[3] These categories provide a structured basis for follow-up, additional testing, referral, and clinical decision-making, although cytological findings must always be interpreted together with relevant clinical information.

In Indonesia, cervical cancer screening services have expanded through national and

regional health initiatives, but participation has historically remained below established program targets. An evaluation of the national cervical and breast cancer screening program reported that only 9.8% of the target population of women aged 30–50 years had been screened during 2007–2018, with substantial variation among provinces.[4] This uneven coverage suggests differences in service availability, geographical accessibility, local implementation capacity, public awareness, and utilization of preventive healthcare. Women living in areas with limited facilities or trained personnel may experience greater difficulty obtaining screening and completing follow-up examinations. Consequently, increasing national coverage requires not only broader program availability but also more equitable service distribution and stronger continuity across initial screening, diagnostic confirmation, and subsequent management.

Screening participation is also influenced by access to information, educational background, health literacy, perceived susceptibility, and social support.[5] Women who understand the purpose of screening and the benefits of detecting cervical abnormalities early may be more willing to undergo examination. Encouragement from family members, peers, community leaders, and healthcare professionals can further strengthen screening intentions. Conversely, fear of a cancer diagnosis, embarrassment, misconceptions about the procedure, concerns regarding discomfort, and insufficient social encouragement may discourage participation. These barriers demonstrate that improving screening uptake requires culturally appropriate communication and respectful, confidential, patient-centered services. Health education should explain that screening is intended for early detection and prevention, rather than being limited to women who already experience gynecological symptoms. Effective counseling may also improve adherence to referral and follow-up recommendations after an abnormal result.

At the health-system level, selection of a cervical screening modality must consider diagnostic performance, cost, infrastructure, laboratory capacity, availability of trained personnel, patient accessibility, and implementation feasibility. Conventional Pap smear examination and HPV DNA testing have different operational requirements, and their relative advantages may vary across healthcare settings. An Indonesian economic evaluation demonstrated that the relative value of Pap smear and HPV DNA testing depends strongly on local implementation costs and analytical assumptions.[6] Screening strategies should be adapted to local resources, population needs, and service-delivery capacity. The existence of screening facilities does not automatically lead to high participation. Regional evidence indicates that screening uptake may remain suboptimal even among health personnel, despite their expected

exposure to medical information and preventive health recommendations.[7]

Hospital-based cytology records can complement population-level screening indicators by describing the spectrum of findings encountered in routine clinical practice. National statistics primarily provide information on coverage and participation, whereas institutional records reveal the proportions of NILM and various epithelial abnormalities among patients who actually undergo examination. Such profiles may support internal quality evaluation, clinical counseling, referral planning, resource allocation, and assessment of follow-up requirements. They may also allow healthcare institutions to monitor cytological patterns over time and compare their findings with those reported in other clinical settings. Nevertheless, hospital-based data must be interpreted with caution because hospital patients may differ from the general population in symptoms, risk characteristics, referral patterns, and reasons for undergoing Pap smear examinations. Accordingly, the observed distribution should be regarded as an institutional clinical profile rather than a direct estimate of population prevalence.

The present study therefore aimed to describe the distribution of conventional Pap smear cytology results among gynecological patients at Siloam Hospital in West Jakarta during 2023–2025. The primary objective was to determine the overall distribution of NILM and abnormal Bethesda categories, including ASC-US, ASC-H, LSIL, HSIL, and AGC. Secondary objectives were to present cytological distributions across age groups, parity categories, and recorded hormonal-status groups, thereby providing a more detailed description of the patients included in the dataset. Because the study used a descriptive design, subgroup comparisons were intended to characterize the sample rather than establish causal relationships, identify independent risk factors, or demonstrate statistically confirmed associations. The resulting institutional profile is expected to support the evaluation of cervical cytology services, the planning of follow-up pathways, the improvement of clinical documentation, and the development of future analytical research on cervical abnormalities in hospital-based populations.

Methods

This study used a retrospective descriptive cross-sectional design based on secondary medical record data. The study population comprised female gynecological patients who underwent conventional Pap smear examination at Siloam Hospital, West Jakarta, from January 2023 through December 2025. Data extraction, cleaning, and analysis were conducted from January to March 2026. Total sampling was used to include all records that met the eligibility criteria during the study period.

The inclusion criteria were a conventional Pap smear performed during the specified period, availability of the examination date and age, and a cytology report categorized using the Bethesda reporting system.[3] Records were excluded when key data were incomplete, the cytology report was available only as an unstandardized narrative, or the examination represented a repeat test for a patient already included during the study period; in the latter situation, only the first eligible examination was retained to avoid duplicate counting. After application of these criteria, the analytic dataset comprised 4,178 eligible first examinations. A separate count of records removed for incompleteness or repeat testing was not available in the analytic dataset.

The variables extracted were age, parity, recorded hormonal status, and final cytology category. Recorded hormonal status was abstracted exactly as documented in the medical record as reproductive, premenopausal, or menopausal and was not inferred or reclassified solely from chronological age. Cytology categories were taken from finalized routine reports in the medical record; no study-specific slide rereading, interobserver adjudication, or additional cytological quality-control procedure was performed for this retrospective analysis. Information on the number of cytopathologists and details of routine laboratory screening or quality-control procedures was not consistently available in the extracted dataset. Data were entered and double-checked in SPSS before analysis. Statistical analysis was descriptive, consisting of frequencies and percentages; no inferential hypothesis testing was performed. Subgroup percentages were calculated using each subgroup total as the denominator. For descriptive age-stratified reporting, patients were grouped into age categories of <30, 30–39, 40–49, 50–59, and ≥60 years. These age categories correspond to those used in a published retrospective study of cervical cytology findings and were used for description rather than as clinical screening-eligibility thresholds.[8] Parity was categorized as 0, 1–2, 3–4, and ≥5 according to the recorded number of births. Completeness of age, parity, hormonal status, and cytology variables was checked in the retained analytical dataset; no imputation was required.

Ethical approval for this hospital-based retrospective study was granted by the Research Ethics Committee, Faculty of Medicine, Universitas Tarumanagara (FK UNTAR), under approval No. 628/KEPK/FK UNTAR/IX/2025. Siloam Hospital in West Jakarta was the source of the study and medical record data, while the FK UNTAR Ethics Committee conducted the ethical review of the research protocol.

Results

Characteristics of research subjects

A total of 4,178 eligible first conventional Pap smear examinations were included. There were no missing data for age, parity, recorded hormonal status, or cytology category in the final analytic dataset. The largest age group was 40–49 years (1,193; 28.6%), followed by 50–59 years (1,056; 25.3%), 30–39 years (1,036; 24.8%), ≥60 years (507; 12.1%), and <30 years (386; 9.2%). For parity, 2,023 patients (48.4%) had one or two births, 1,281 (30.7%) were nulliparous, 821 (19.7%) had three or four births, and 53 (1.3%) had five or more births. Recorded hormonal status was reproductive in 2,174 patients (52.0%), premenopausal in 629 (15.1%), and menopausal in 1,375 (32.9%) (**Table 1**).

Table 1. Characteristics of research subjects (N = 4,178)

Characteristics	Frequency (n)	Percentage (%)
Age group (years)		
<30	386	9.2
30–39	1,036	24.8
40–49	1,193	28.6
50–59	1,056	25.3
≥60	507	12.1
Parity (number of births)		
0 (nulliparous)	1,281	30.7
1–2	2,023	48.4
3–4	821	19.6
≥5	53	1.3
Recorded hormonal status		
Reproductive	2,174	52.0
Premenopausal	629	15.1
Menopausal	1,375	32.9

Age groups (<30, 30–39, 40–49, 50–59, ≥60 years) follow the descriptive categories used in a published cervical cytology cohort;[8] they do not represent clinical screening eligibility criteria. Parity denotes recorded births (0, 1–2, 3–4, ≥5), and hormonal status follows the medical-record designation rather than age. Percentages use N = 4,178 as the denominator.

Overall distribution of conventional Pap smear findings

Among 4,178 examinations, NILM was the most common finding (3,707; 88.73%), followed by ASC-US (455; 10.89%), LSIL (8; 0.19%), ASC-H (5; 0.12%), HSIL (2; 0.05%), and AGC (1; 0.02%). No invasive malignancy was documented (**Table 2**).

Table 2. Distribution of conventional Pap smear cytology results (N=4,178)

Cytology result	Frequency (n)	Percentage (%)
NILM	3,707	88.73
ASC-US	455	10.89
ASC-H	5	0.12
LSIL	8	0.19
HSIL	2	0.05
AGC	1	0.02

Cytology results were classified using the Bethesda System.[3] Percentages are calculated using all 4,178 examinations as the denominator. Abbreviations: NILM, negative for intraepithelial lesion or malignancy; ASC-US, atypical squamous cells of undetermined significance; ASC-H, atypical squamous cells cannot exclude HSIL; LSIL, low-grade squamous intraepithelial lesion; HSIL, high-grade squamous intraepithelial lesion; AGC, atypical glandular cells.

Distribution by age group, parity, and recorded hormonal status

ASC-US represented 10.36%, 11.49%, 11.48%, 9.75%, and 11.05% of examinations in the <30, 30–39, 40–49, 50–59, and ≥60-year age groups, respectively. The distribution of rare ASC-H, LSIL, HSIL, and AGC results is descriptive only; small counts do not support conclusions about between-group differences (**Table 3**).

Parity of 1–2 was most common (2,023; 48.4%), followed by nulliparity (1,281; 30.7%), parity 3–4 (821; 19.7%), and parity ≥5 (53; 1.3%). NILM predominated across all parity categories, while ASC-US ranged from 9.43% to 11.67%. The small ≥5 group and rare high-grade abnormalities preclude reliable between-group comparisons **(Table 4)**.

Recorded hormonal status comprised 2,174 reproductive patients (52.0%), 629 premenopausal patients (15.1%), and 1,375 menopausal patients (32.9%). NILM represented 88.68%, 88.08%, and 89.09% of these groups, respectively, while ASC-US represented 11.04%, 10.97%, and 10.62%. Hormonal status was analyzed as documented in the source record and was not assigned solely from chronological age. Because very small numbers were represented in ASC-H, LSIL, HSIL, and AGC, their percentages across hormonal-status groups should be interpreted with caution **(Table 5)**.

Table 3. Distribution of cytology results by age group (N=4,178)

Age Group	NILM n (%)	ASC-US n (%)	ASC-H n (%)	LSIL n (%)	HSIL n (%)	AGC n (%)
<30 years	345 (89.38)	40 (10.36)	0 (0.00)	1 (0.26)	0 (0.00)	0 (0.00)
30-39 years	913 (88.13)	119 (11.49)	0 (0.00)	2 (0.19)	1 (0.10)	1 (0.10)
40-49 years	1,052 (88.18)	137 (11.48)	1 (0.08)	3 (0.25)	0 (0.00)	0 (0.00)
50-59 years	950 (89.96)	103 (9.75)	2 (0.19)	1 (0.09)	0 (0.00)	0 (0.00)
≥60 years	447 (88.17)	56 (11.05)	2 (0.39)	1 (0.20)	1 (0.20)	0 (0.00)

Values are n (row %); percentages are based on the total number of examinations in each age group. Cytology categories follow the Bethesda System.[3] Abbreviations: NILM, negative for intraepithelial lesion or malignancy; ASC-US, atypical squamous cells of undetermined significance; ASC-H, atypical squamous cells cannot exclude HSIL; LSIL, low-grade squamous intraepithelial lesion; HSIL, high-grade squamous intraepithelial lesion; AGC, atypical glandular cells.

Table 4. Distribution of cytology results by parity (N=4,178)

Parity Classification	NILM n (%)	ASC-US n (%)	ASC-H n (%)	LSIL n (%)	HSIL n (%)	AGC n (%)
0 (nulliparous)	1,150 (89.77)	129 (10.07)	2 (0.16)	0 (0.00)	0 (0.00)	0 (0.00)
1-2	1,777 (87.84)	236 (11.67)	1 (0.05)	6 (0.30)	2 (0.10)	1 (0.05)
3-4	733 (89.28)	85 (10.35)	2 (0.24)	1 (0.12)	0 (0.00)	0 (0.00)
≥5	47 (88.68)	5 (9.43)	0 (0.00)	1 (1.89)	0 (0.00)	0 (0.00)

Values are n (row %); percentages are based on the total number of examinations in each parity group. Cytology categories follow the Bethesda System.[3] Abbreviations: NILM, negative for intraepithelial lesion or malignancy; ASC-US, atypical squamous cells of undetermined significance; ASC-H, atypical squamous cells cannot exclude HSIL; LSIL, low-grade squamous intraepithelial lesion; HSIL, high-grade squamous intraepithelial lesion; AGC, atypical glandular cells.

Discussion

The present study showed that NILM accounted for 88.73% of 4,178 examinations, while ASC-US was the predominant abnormal category (10.89%). High-grade abnormalities and AGC were rare, and no invasive malignancy was documented. Hospital-based Pap smear

series across different clinical settings similarly report a predominance of non-high-grade findings, although the exact distribution varies with referral patterns and population characteristics.[9–11]

Table 5. Distribution of cytology results by recorded hormonal status (N=4,178)

Hormonal Status	NILM n (%)	ASC-US n (%)	ASC-H n (%)	LSIL n (%)	HSIL n (%)	AGC n (%)
Reproductive	1,928 (88.68)	240 (11.04)	2 (0.09)	2 (0.09)	1 (0.05)	1 (0.05)
Premenopausal	554 (88.08)	69 (10.97)	3 (0.48)	2 (0.32)	1 (0.16)	0 (0.00)
Menopausal	1,225 (89.09)	146 (10.62)	0 (0.00)	4 (0.29)	0 (0.00)	0 (0.00)

Values are n (row %); percentages are based on the total number of examinations in each recorded hormonal-status group. Cytology categories follow the Bethesda System.[3] Abbreviations: NILM, negative for intraepithelial lesion or malignancy; ASC-US, atypical squamous cells of undetermined significance; ASC-H, atypical squamous cells cannot exclude HSIL; LSIL, low-grade squamous intraepithelial lesion; HSIL, high-grade squamous intraepithelial lesion; AGC, atypical glandular cells.

The cytological profile should be interpreted in the context of specimen preparation. A large single-center comparison found differences in Bethesda-category distributions between conventional smears and liquid-based cytology.[12] Other comparative studies have reported that liquid-based preparation may improve smear adequacy or background quality in some settings. However, advantages are not uniform across all diagnostic categories and depend on sampling, processing, and interpretation.[13–16] Consequently, the present results primarily describe the performance context of conventional cytology at this institution. They should not be interpreted as a direct estimate of the prevalence of histologically confirmed cervical precancer.

Age-group interpretation also requires attention to denominators. Although the largest absolute number of ASC-US cases occurred among patients aged 40-49 years, the proportion of ASC-US within each age group was relatively similar, ranging from 9.75% to 11.49%. Age remains clinically relevant because HPV acquisition, persistence, and transformation-zone characteristics vary across the life course, but meaningful risk estimation requires HPV and longitudinal outcome data.[17] Organized screening cohorts illustrate the value of linking cytology, HPV testing, histopathology, and follow-up outcomes over time.[18]

Menopausal status can complicate cytological interpretation because estrogen deficiency may produce epithelial atrophy and reactive changes that resemble atypia. Studies

of postmenopausal women with ASC-US have shown that cytological atypia does not necessarily correspond to a comparable rate of clinically significant histological disease.[19] Cyto-histological discrepancy has likewise been associated with menopausal status.[20] In the present dataset, however, the row proportion of ASC-US was not higher in the menopausal group than in the reproductive or premenopausal groups; therefore, estrogen deficiency should be considered only as a possible interpretive context rather than an explanation established by these data.

Abnormal cytology should not be managed on the cytology label alone. Contemporary risk-based management integrates current cytology, high-risk HPV status, prior screening results, prior treatment, and other risk factors to determine whether surveillance, repeat testing, colposcopy, or treatment is appropriate.[21] Updates through 2023 continue to refine management for specific combinations of results and clinical history.[22] Thus, the 455 ASC-US results in this cohort should be viewed as an institutional need for consistent downstream triage and documentation rather than as an indication that all patients require the same procedure.

This study has several strengths and limitations. The three-year dataset is relatively large and uses standardized cytological categories, while row-based subgroup percentages reduce the risk of interpreting raw counts as risk differences. However, the retrospective single-center design limits generalizability; the descriptive design cannot establish causal relationships or independent associations; and information on HPV status, histopathology, prior screening history, indication for testing, smoking, contraceptive or hormone use, and other clinical risk factors was unavailable. The analytic dataset also did not contain a separate exclusion log, and details of routine laboratory quality control, including the number of cytopathologists and any secondary-review or screening protocol, were not consistently available. Very small numbers in the ASC-H, LSIL, HSIL, and AGC categories also make subgroup percentages sensitive to single observations.

Conventional cytology is additionally subject to sampling and interpretation limitations. Future work linking cytology with HPV testing, histopathological follow-up, and longitudinal outcomes would provide a stronger basis for estimating risk and evaluating screening performance in this hospital population.

Conclusion

Among 4,178 gynecological patients who underwent conventional Pap smear examination at Siloam Hospital, West Jakarta, during 2023-2025, most cytology results were NILM (88.73%). ASC-US was the most frequent abnormal finding (10.89%), whereas ASC-H, LSIL, HSIL, and AGC were uncommon, and no invasive malignancy was documented.

Row-based subgroup analysis showed broadly similar ASC-US proportions across age and recorded hormonal-status groups, while the small number of higher-grade abnormalities precluded meaningful comparative conclusions. These findings provide a descriptive three-year institutional cytology profile and support standardized Bethesda reporting, consistent follow-up of abnormal results, and future linkage of cytology with HPV and histopathological data to strengthen evaluation of cervical screening services.

Conflicts of Interest

The authors declare that they have no conflict of interest related to this manuscript.

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