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Original Article

Colposcopic characteristics of women over 18 years of age at the National Hospital of Itauguá, from January to December 2024

Características colposcópicas de mujeres mayores de 18 años en el Hospital Nacional de Itauguá, de enero a diciembre del año 2024

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ABSTRACT

Introduction: Cervical cancer is the fourth most common neoplasia in women worldwide, with high incidence and mortality in America, including Paraguay. Colposcopy is a fundamental diagnostic tool for the identification of cervical neoplasia, guiding biopsies and stratifying risk in patients with altered cytology or high-risk HPV. **Objective:** To analyze the colposcopic characteristics in women over 18 years of age treated in the Gynecology Service of the National Hospital of Itauguá during the months of January to December 2024. **Materials and methods:** A retrospective, cross-sectional, descriptive observational study was carried out. A total of 375 records of women over 18 years of age treated in the Gynecology Service of the National Hospital of Itauguá during the months of January to December 2024 were analyzed. The variables studied were sociodemographic and clinical characteristics. Descriptive statistics were applied using the STATA statistical program. **Results:** The mean age was 43.39 (±13.98) years, with a range of 18 to 79 years. Contraceptives were not used in 43.5% of patients. Colposcopy was adequate in 74.9% of cases. Atrophic epithelium was present in 12.3%. The rate of inadequate colposcopies was 25.1%. Leucorrhea was present in 76.5% of cases, and the "dark irregular" Schiller pattern was present in 26.1%. **Conclusion:** These findings suggest the need to adapt gynecological screening and care protocols in Paraguay.

Keywords: Colposcopy, Atrophy, Inflammation, Leukorrhea.

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RESUMEN

Introducción: El cáncer de cuello uterino es la cuarta neoplasia más frecuente en mujeres a nivel mundial, con incidencia y mortalidad elevadas en América, incluyendo Paraguay. La colposcopia es una herramienta diagnóstica fundamental para la identificación de neoplasias cervicales, guiando biopsias y estratificando el riesgo en pacientes con citología alterada o virus del papiloma humano de alto riesgo. **Objetivo:** Analizar las características colposcopias en mujeres mayores de 18 años atendidas en el Servicio de Ginecología del Hospital Nacional de Itauguá durante el año 2024. **Materiales y métodos:** El estudio fue observacional, descriptivo, retrospectivo de corte transversal. Se analizaron 375 expedientes de mujeres mayores de 18 años atendidas en el Servicio de Ginecología del Hospital Nacional de Itauguá. Las variables estudiadas fueron características clínicas y sociodemográficas. Se aplicó la estadística descriptiva y se utilizó el programa estadístico STATA 13. **Resultados:** La edad promedio fue de 43.39 (±13.98) años, con un rango de 18 a 79 años. El 43.5% de las pacientes no usaba anticonceptivos. La colposcopia fue adecuada en el 74.9% de los casos. Se observó la presencia de epitelio atrófico en 12.3%. La leucorrea fue del 76.5%, y el patrón de Schiller "oscuro irregular" se presentó en un 26.1%. **Conclusión:** Estos hallazgos sugieren la necesidad de adaptar protocolos de tamizaje y atención ginecológica en Paraguay.

Palabras Clave: Colposcopía, Atrofia, Inflamación, Leucorrea.

Introduction

Cervical cancer remains one of the leading causes of morbidity and mortality among women worldwide, representing the fourth most frequent neoplasm in the female population [1]. Its high incidence and mortality in middle- and low-income countries, especially in Latin America, reflect profound inequalities in access to organized prevention programs, timely diagnosis, and adequate follow-up. Persistent infection with oncogenic genotypes of the human papillomavirus (HPV) constitutes the main etiological factor in the development of squamous intraepithelial lesions and invasive cervical carcinoma. In Paraguay, epidemiological data show an incidence rate of 23.8 cases per 100,000 women, placing the country among those with the highest disease burden in the region [2].

Colposcopy, originally described by Hans Hinselmann in 1925, consists of the magnified visualization of the exocervix and endocervix after the application of acetic acid and Lugol's iodine, allowing the identification of acetowhite areas, abnormal vascular patterns, and other alterations suggestive of cervical neoplasia [3]. Its main utility lies in guiding directed biopsies of suspicious areas and in risk stratification of patients with abnormal screening tests. The guidelines of the American College of Obstetricians and Gynecologists (ACOG) indicate colposcopy in all women over 21 years of age with high-grade squamous intraepithelial lesions (HSIL), persistent low-grade squamous intraepithelial lesions (LSIL), or a positive high-risk HPV test, underscoring its fundamental role in the diagnostic algorithm of cervical cancer [4].

Since its introduction, colposcopy has evolved significantly, incorporating standardized criteria aimed at improving reproducibility and diagnostic accuracy. International recommendations, including the guidelines of the American Society for Colposcopy and Cervical Pathology (ASCCP) and the terminological standardization of the International Federation for Cervical Pathology and Colposcopy (IFCPC), have contributed to harmonizing the interpretation of colposcopic findings [5,6]. However, the diagnostic accuracy of colposcopy varies according to multiple intrinsic and extrinsic factors. Intrinsic factors include the operator's experience and level

of training, whereas extrinsic factors involve local cervical conditions, such as the presence of cervical inflammation that may hinder adequate visualization of lesions [7].

International studies have demonstrated variable sensitivities for the detection of cervical lesions by colposcopy. A study conducted in China by Chu et al. reported a sensitivity of 85.7% and a specificity of 93.4% for detecting high-grade lesions; however, sensitivity decreased to 70% in women younger than 45 years [7,8]. Integration of prior cytological results significantly improves concordance with histology, increasing sensitivity and negative predictive value to up to 98.2% in cohorts with available cytological information [9]. Nevertheless, colposcopic interpretation remains subject to interobserver variability, particularly in type 3 transformation zones and glandular lesions, where atypical vascular patterns such as rosette-like vessels may go unnoticed [10].

The transformation zone (TZ) is the area of the cervix where squamous metaplasia occurs and where most precursor lesions of cervical cancer originate. Its classification into TZ1, TZ2, and TZ3 has important diagnostic implications. TZ1 is characterized by being completely visible on the exocervix; TZ2 has one portion visible on the exocervix and another extending into the endocervical canal; whereas TZ3 is located entirely within the endocervical canal. The latter, which is common in older women and during the postmenopausal period, limits complete visualization of the squamocolumnar junction and significantly hinders colposcopic evaluation [11]. Likewise, local inflammatory conditions such as abundant leukorrhea and atrophic epithelium may interfere with adequate interpretation of acetowhite patterns and Lugol's iodine uptake [12].

In the Paraguayan context, where access to gynecological health services varies significantly between urban and rural areas [13], published evidence on colposcopic characteristics is limited. Local studies have documented the circulation of high-risk HPV genotypes and persistent barriers to access to cervical cancer screening [14,15]. This lack of comprehensive data on cervical characteristics observed in Paraguayan clinical practice hinders the development of protocols adapted to the country's epidemiological and healthcare reality. In this context, it is necessary to generate descriptive information that allows understanding of colposcopic patterns observed in routine clinical practice and contributes to the improvement of secondary prevention services for cervical cancer. Therefore, the objective of the present study was to describe the colposcopic characteristics of women over 18 years of age attended at the Gynecology Service of the National Hospital of Itauguá during the year 2024.

Materials and Methods

An observational, descriptive, retrospective, cross-sectional study was conducted, based on the review of medical records of women over 18 years of age who underwent colposcopy at the Gynecology Service of the National Hospital of Itauguá between January and December 2024. The methodological design followed the general principles of descriptive studies in public health [16,17].

All patients with complete records of gynecological history and detailed colposcopic findings were included. Medical records with incomplete data, improperly completed forms, or colposcopies performed for non-gynecological indications were excluded. Non-probabilistic consecutive case sampling was used. Sample size was calculated using the Stata program, considering an estimation error of 6%, a 95% confidence level, and an expected proportion of inadequate colposcopies of 50%. The minimum sample size calculated for an infinite population was 267 records; ultimately, 375 valid cases were included in the analysis.

Colposcopy was performed by gynecologists with formal training in the procedure, using standard colposcopic equipment with magnification ranging from 10× to 40×. The

procedure included initial inspection under white light, application of 3% acetic acid, evaluation of acetowhite epithelium and its characteristics (density, borders, surface), analysis of vascular patterns (punctation and mosaic), and finally the Schiller test with Lugol's iodine solution. Findings were classified according to the standardized terminology of the International Federation for Cervical Pathology and Colposcopy (IFCPC) 2017 [6].

Colposcopy was defined as adequate when the squamocolumnar junction was completely visible after the application of acetic acid, allowing full evaluation of the entire transformation zone. Colposcopy was considered inadequate when the squamocolumnar junction was not fully visible, either due to its location within the endocervical canal (TZ3), the presence of severe inflammation, abundant leukorrhea preventing adequate visualization, or marked atrophic epithelium.

The variables studied included sociodemographic characteristics (age, place of origin), gynecological history (age at menarche, menstrual pattern, pregnancies, deliveries, cesarean sections, abortions, use of contraceptive methods), general colposcopic assessment (adequate or inadequate), visibility of the squamocolumnar junction (completely visible, partially visible, not visible), type of transformation zone (TZ1, TZ2, TZ3), types of epithelium observed (original squamous, columnar, metaplastic, atrophic), additional findings (inflammation, leukorrhea, polyp, condyloma, stenosis), Lugol's iodine uptake (Schiller pattern), and abnormal colposcopic findings when present.

Data were collected on a specially designed form and subsequently entered into an Excel database. Statistical analysis was performed using STATA version 13. Descriptive statistics were applied, using measures of central tendency (mean and standard deviation) for quantitative variables and absolute and relative frequencies (percentages) for qualitative variables. The study was approved by the Ethics Committee of the National Hospital of Itauguá, and the ethical principles established in the Declaration of Helsinki for research involving human subjects were respected [18].

Results

A total of 375 medical records of women who underwent colposcopy during the study period were analyzed. The mean age of the patients was 43.39 years, with a standard deviation of 13.98 years, showing a wide age range from 18 to 79 years. The distribution by age groups showed that 35.2% of the women were between 35 and 44 years old, 26.1% between 45 and 54 years old, and 16.5% between 25 and 34 years old (Table 1). The mean age at menarche was 12.8 years. Regarding obstetric history, the mean number of pregnancies was 3.2, with an average of 2.1 deliveries and 0.8 cesarean sections.

With respect to contraceptive use, 43.5% of patients were not using any contraceptive method at the time of consultation. Among those who used a method, oral contraceptives were the most frequent (15.5%), followed by tubal ligation (BTL) in 11.4%, injectable contraceptives in 8.3%, and condoms in 7.2% (Table 1). A relevant finding was that 12% of women attended for their first cervical cytology test, highlighting persistent barriers to access to preventive screening.

Gynecologic–obstetric history showed that the frequency of pregnancies and deliveries increased with age. In the 35–44-year age group, 81 pregnancies (21.6%) and 63 vaginal deliveries (16.8%) were recorded, whereas in the 45–54-year group, 69 pregnancies (18.4%) and 56 deliveries (14.9%) were documented. Cesarean sections were more frequent in the middle-age groups, with 37 cases (9.9%) in the 45–54-year group and 35 cases (9.3%) in the 35–44-year group (Table 2).

Table 1. Description by age group and contraceptive method used (n = 375).

Characteristics	n	%
Age Group		
18-24 years old	15	4,1
25-34 years old	62	16,5
35-44 years old	132	35,2
45-54 years old	98	26,1
55-64 years old	42	11,2
≥65 years old	26	6,9
Contraceptive Method		
None	163	43,5
Oral	58	15,5
OTB (Tubal ligation)	43	11,4
Injectable	31	8,3
Condom	27	7,2
Levonorgestrel-releasing IUD	24	6,4
Copper T IUD	18	4,8
Implant	11	2,9

Table 2. Gynecological and obstetric history of pregnancy, deliveries, cesarean sections, abortions and first PAP test according to age range n=375.

Age	Pregnancies		Vaginal births		Cesarean sections		Abortions		PAP	
	n	%	n	%	n	%	n	%	n	%
18-24 years old	17	4,5	11	2,9	4	1,1	3	0,8	16	4,3
25-34 years old	52	13,9	25	6,7	18	4,8	7	1,9	18	4,8
35-44 years old	81	21,6	63	16,8	35	9,3	18	4,8	6	1,6
45-54 years old	69	18,4	56	14,9	37	9,9	15	4,0	0	0
55-64 years old	59	15,7	51	13,6	34	9,1	19	5,1	3	0,8
≥65 years old	26	6,9	24	6,4	5	1,3	10	2,7	2	0,5
Total	304	81,1	230	61,3	133	35,5	72	19,2	45	12

Regarding the adequacy of the colposcopic examination, colposcopy was considered adequate in 74.9% of cases, allowing complete evaluation of the transformation zone, whereas in the remaining 25.1% the examination was deemed inadequate. The main causes of inadequacy were the presence of abundant leukorrhea preventing clear visualization of the cervical surface, severe cervical inflammation, marked atrophic epithelium—especially in postmenopausal women—and the presence of a type 3 transformation zone with a non-visible squamocolumnar junction.

Among the most frequent colposcopic findings, leukorrhea was the most prevalent, present in 76.5% of the examined patients. This finding markedly exceeded the frequency reported in other regional studies. The predominant epithelial type was mature/columnar epithelium, observed in 76.5% of cases. Atrophic epithelium was identified in 12.3% of patients, mainly among perimenopausal and postmenopausal women older than 45 years. Cervical inflammation was documented in 38.1% of cases (Table 3). The Schiller test with Lugol's iodine showed a "dark irregular"

uptake pattern in 26.1% of cases, correlating with active cervical inflammatory processes.

Regarding transformation zone classification, the observed distribution was as follows: TZ1 in 50.7% of cases, TZ2 in 13.3%, and TZ3 in 28.8%. TZ3 was predominantly observed in women older than 40 years and was associated with a higher likelihood of an inadequate examination, constituting one of the main limiting factors for complete visualization of the squamocolumnar junction. In patients with TZ1 and TZ2, the rate of adequate colposcopies reached 89.2%, whereas in those with TZ3 adequacy decreased significantly to 45.6%.

Abnormal vascular patterns were less frequent compared with inflammatory findings. Grade 1 abnormal findings (fine mosaic and fine punctation) were observed in only 2 cases (0.5%), always associated with acetowhite epithelium. Dense acetowhite epithelium, suggestive of high-grade lesions, was infrequent, whereas faint acetowhite epithelium—more commonly associated with low-grade lesions or inflammatory changes—was observed more frequently.

Table 3. Main colposcopic findings. (n=375)

Characteristics	n	%
Type of epithelium		
Mature/columnar	287	76,5
Atrophic	46	12,3
Ectopy	42	11,2
Inflammation	143	38,1
Leukorrhea	287	76,5
Abnormal findings*	2	0,5

*Only two cases: fine mosaic/fine stippling (grade 1)

Discussion

The results of the present study demonstrate that the quality of the colposcopic examination is significantly influenced by local anatomical and clinical factors. The frequency of inadequate colposcopies observed (25.1%) was higher than that reported in Brazil, where it reaches approximately 15% [19], but lower than reports from sub-Saharan African countries, where it may reach 35–40% [20]. This variability in inadequacy rates reflects differences in population characteristics, operator experience, criteria used to define examination adequacy, and local conditions of healthcare services.

Complete visibility of the squamocolumnar junction tends to progressively decrease with age, particularly during the perimenopausal and postmenopausal periods, due to the physiological retraction of the transformation zone into the endocervical canal. For this reason, when type 3 transformation zones are identified—as occurred in 28.8% of cases in this study—greater operator experience and training are required to avoid false-negative results that may lead to undetected lesions (11,21). The proportion of TZ3 found in our series is comparable to that reported in studies from other Latin American countries such as Bolivia, Chile, and Mexico, where this proportion ranges between 25% and 32%, depending on the demographic characteristics of the population studied [11].

The finding of atrophic epithelium in 12.3% of patients was lower than that reported in Mexican and Brazilian studies, where this finding reaches 15–28% in women older than 55 years [22]. Atrophic epithelium represents a particular diagnostic challenge, as the estrogen deficiency characteristic of the postmenopausal period reduces Lugol's iodine

uptake and may simulate the presence of acetowhite lesions, generating false-positive results [12]. This highlights the fundamental importance of interpreting colposcopy within the specific clinical and hormonal context of each patient, taking into account age, menopausal status, and gynecological history.

The high frequency of leukorrhea observed in our series (76.5%) far exceeds that reported in studies from Uruguay where it reaches 60% [23] and Brazil where it is around 55% [24]. This difference may reflect several factors, including a higher prevalence of untreated vaginal infections in our population, barriers to access to reproductive health services for timely diagnosis and treatment of infections, deficiencies in patient preparation protocols prior to colposcopic examination, or differences in criteria used for the definition and recording of leukorrhea among studies. The “dark irregular” Schiller pattern observed in 26.1% of cases, correlated with active cervical inflammatory processes, is consistent with international standards reported in the specialized literature [6]. This pattern is of particular clinical utility for identifying and characterizing active inflammatory processes that may interfere with proper interpretation of colposcopic findings, allowing, in many cases, postponement of the examination until after appropriate treatment of inflammation.

The rate of inadequate colposcopies found in this study falls within the ranges reported in the international literature, including African studies conducted in settings with a high burden of cervical inflammation [20]. However, other findings reveal important challenges in the comprehensive prevention of cervical cancer in our region. Low coverage of cervical cytology, with 12% of women undergoing the test for the first time at the time of this colposcopic examination, together with the high frequency of inadequate examinations (25.1% in this study), may indicate persistent and significant failures in the national cervical screening system. These failures include both geographic and economic access barriers as well as deficiencies in the technical quality of performed procedures.

Effective integration of cervical cytology, HPV testing, and colposcopy, as recommended by the World Health Organization and the American Society for Colposcopy and Cervical Pathology, is essential to improve clinical decision-making and optimize the use of available diagnostic resources [5,15]. This integration should be complemented by continuous training programs for professionals performing colposcopy, standardization of terminology, and improvements in patient registration and follow-up systems.

Finally, the high frequency of non-use of contraception (43.5%) reflects important systemic barriers in access to family planning services. Effective integration of family planning services with specific cervical cancer prevention programs, as has been successfully implemented in Brazil and other countries in the region, could significantly contribute to breaking this cycle through unified consultations that simultaneously address both aspects of reproductive health [25]. This study has limitations inherent to its retrospective design based on secondary data. It was not possible to obtain information on detailed aspects of patients’ sexual lives, to expand the geographic coverage of the study, or to systematically correlate colposcopic findings with subsequent histological results and integrate molecular HPV genotyping data.

Conclusions

This study comprehensively describes the colposcopic characteristics of women over 18 years of age treated at a referral hospital within the Paraguayan public health system, showing a high frequency of leukorrhea, cervical inflammation and atrophic epithelium, as well as a considerable proportion of type 3 transformation zone. These factors significantly influence both the appropriateness and interpretation of the colposcopic examination, sometimes limiting the diagnostic capacity of

the procedure.

The findings provide relevant local evidence for the Paraguayan context and underscore the urgent need to strengthen multiple aspects of the national cervical cancer prevention program. Among the identified priorities are the rigorous standardization of colposcopic procedures according to international terminology, the optimization of patient preparation prior to examination through timely treatment of infections, the promotion of effective integration among the various screening (cytology, HPV test) and diagnostic (colposcopy, biopsy) strategies for cervical cancer, and the development of ongoing training programs for professionals in colposcopic technique and updates on standardized diagnostic criteria.

Finally, it is essential to improve universal access to comprehensive reproductive health services, including both cervical screening and family planning, adapting care protocols to the epidemiological, demographic, and sociocultural realities of Paraguay. These coordinated efforts could significantly contribute to reducing morbidity and mortality from cervical cancer in the country and advance toward the elimination goals established by the World Health Organization.

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