Prevalence and Risk Factors Associated with Cytolytic Vaginosis in Women from the Coffee Region, Colombia

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Abstract

Introduction: Cytolytic vaginosis is a controversial and underrecognized condition that is often overlooked in women presenting with vaginal discharge syndrome. Therefore, the aim of this study was to determine the prevalence of cytolytic vaginosis and to identify associated risk factors.

Materials and Methods: A cross-sectional study was conducted in 197 women with vaginal discharge, attended at three referral clinics in the Coffee Region (Colombia) between February and November 2024. Diagnosis was established according to Cibley's criteria. Sociodemographic, reproductive, sexual, behavioral, personal history, and intimate hygiene variables were analyzed. Odds ratios (OR) and their corresponding 95% confidence intervals (95% CI) were calculated.

Results: The mean age of participants was 34.68 ± 5.29 years. The prevalence of cytolytic vaginosis was 23.85% (n=47/197). Among menopausal women, prevalence was 36.11% (n=13/36), compared to 21.11% (n=34/161) in non-menopausal women. Associations were found with the use of home remedies (OR = 7.51; 95% CI: 3.7–15.2), intimate hair removal (OR = 7.02; 95% CI: 3.6–13.8), and infidelity (OR = 6.79; 95% CI: 2.9–16.2). Condom use (OR = 0.28; 95% CI: 0.1–0.7) and the use of cotton underwear (OR = 0.35; 95% CI: 0.1–0.9; $p<0.05$) showed a protective association.

Conclusions: The prevalence of cytolytic vaginosis is high among women in the Coffee Region. Its symptoms should be actively assessed in patients presenting with vaginal discharge syndrome. Further research is required to confirm its presence in our setting and to ensure accurate diagnosis and effective treatment.

Keywords: vaginal discharge; prevalence; risk factors; microbiota.

Introduction

Cytolytic vaginosis is an uncommon condition characterized by persistent vaginal discharge, in which an overgrowth of lactobacilli leads to excessive acidification of the local pH, resulting in a vaginal discharge syndrome with manifestations such as abnormal discharge, irritation, itching or pruritus, dysuria, and dyspareunia, which can be easily confused with vulvovaginal candidiasis (1).

Cytolytic vaginosis is not a new concept; it has been described in the scientific literature since 1961 (2). However, it was not until 1991 that the term "cytolytic vaginosis" was coined (3), after identifying women with symptoms similar to vulvovaginal candidiasis but with a considerably different pathophysiology and treatment approach.

From a clinical perspective, it typically occurs in women of reproductive age, who frequently seek medical care due to persistent vaginal discharge syndrome that is refractory to conventional therapy (1). These patients often receive multiple antifungal treatments because of misdiagnosis as common vulvovaginal candidiasis associated with Candida albicans (1,4).

The normal vaginal flora in adult women of reproductive age includes lactobacilli in low quantities (approximately five per ten squamous cells in vaginal secretions), which is considered protective, as it provides an important microbial defense against genital colonization by pathogens (5). In contrast, cytolytic vaginosis is a vaginal condition caused by an overgrowth of lactobacilli (1,6), leading to lysis of vaginal epithelial cells, from which its name is derived (7). It is also referred to as Lactobacillus overgrowth syndrome or Döderlein cytolysis; however, the term cytolytic vaginosis is preferred, as only some lactobacillus species are classified as Döderlein bacilli (5–8). In summary, it is a clinical condition characterized by a high number of lactobacilli, lysed epithelial cells, and free nuclei in the vaginal environment, along with a markedly low vaginal pH (3,6–9).

Currently, cytolytic vaginosis remains a largely unknown, controversial, and under-researched condition (10). In fact, its existence as a distinct clinical entity has been questioned, and some authors suggest that its symptoms may be physiological (11). Nevertheless, several studies have reported prevalence rates ranging from 1.83% to 26.7% (12).

Regarding diagnosis, it has been based for decades on clinical findings according to Cibley's criteria (3). Treatment focuses on controlling acidity

and restoring vaginal pH through the use of sodium bicarbonate douches or suppositories, in order to reduce the excessive population of lactobacilli (1,3,7,13).

It is important to highlight the clinical relevance of this condition, which is frequently misdiagnosed as vulvovaginal candidiasis. Its symptomatology is now recognized to negatively impact women's quality of life (1,4,7,14), compounded by the fact that in many cases it is neither properly diagnosed nor adequately treated. In this context, the aim of this study was to determine the prevalence of cytolytic vaginosis and to identify associated risk factors in women from the Coffee Region of Colombia.

Materials and Methods

Study design and population: A cross-sectional study was conducted. Women aged 18 years or older who presented with persistent vaginal discharge at outpatient gynecology clinics in three high-complexity private healthcare institutions were included. These institutions, which also serve as university training centers, are located in the Coffee Region (Pereira, Armenia, and Manizales, Colombia), between February 1 and November 2024. They provide care to patients affiliated with both the contributory and subsidized regimes of the Colombian social security system.

Pregnant women, those within the first 12 months postpartum, and women with a history of cancer, pelvic surgery, hysterectomy, or oophorectomy, as well as those with neurological deficits or cognitive impairment, were excluded. Women who were illiterate or declined to participate were also excluded. Consecutive convenience sampling was used, and no sample size calculation was performed.

Procedure: At each institution, a gynecology specialist assessed eligibility criteria. Participants were then informed about the study objectives and asked to sign an informed consent form. After consent was obtained, a sociodemographic and risk factor questionnaire was administered.

The diagnosis of cytolytic vaginosis was established according to Cibley's criteria (3): vaginal pH ≤ 4.5, overgrowth of lactobacilli on Gram stain, presence of "false clue cells," cytolysis of vaginal epithelial cells, low or absent leukocyte count, and absence of other vaginitis/vaginosis pathogens. Reported sensitivity and specificity for these diagnostic criteria are 80% and 99% for epithelial cytolysis; 70% and 99% for "false clue cells"; 100% and 86% for pH ≤ 4.5; and 100% and 56% for abundant lactobacilli, respectively (15).

Vaginal pH measurement: Vaginal pH was measured using Merck colorimetric strips (Merck & Co., Inc., Kenilworth, NJ, USA), with a measurement range of 4.0 to 7.0 and increments of 0.3 units. The strip was placed on the mid-third of the vaginal wall, avoiding contact with cervical mucus, and the value was recorded after one minute by comparison with the reference scale.

Microscopy: Vaginal discharge smears (Gram stain and KOH preparation) were analyzed. A sample of vaginal discharge was spread on a slide and allowed to dry for Gram staining. Vaginal microbiota type (predominance of Lactobacillus species or other bacteria), cellularity, bacterial morphology, and leukocyte presence (absent: 1–4; present: >4) were evaluated.

Fungal identification was performed by detecting yeasts, pseudohyphae/hyphae, and/or blastoconidia using direct microscopy with KOH staining (wet mount preparation). Bacterial vaginosis was diagnosed according to Amsel's criteria (16) and a Nugent score ≥7 (17). Trichomonas vaginalis infection was identified by direct visualization of the protozoan in fresh wet mount microscopy.

Measured variables: Sociodemographic variables included age, race, educational level, socioeconomic status, marital status, occupation, place of residence, religion, and social security regime. Anthropometric variables included weight, height, and body mass index (BMI). Behavioral variables included smoking, alcohol consumption, use of psychoactive substances, and physical inactivity. Comorbidities were also recorded.

Sexual and reproductive health variables included age at first childbirth, parity, use of hormonal contraception, age at menopause, duration of menopause, use of hormone therapy, and history of sexually transmitted infections. Sexual behavior variables included sexual orientation, age at sexual debut, sexual practices (vaginal intercourse, anal intercourse, and masturbation), weekly frequency of sexual activity, use of sex toys, number of sexual partners, duration of cohabitation with a partner, and infidelity.

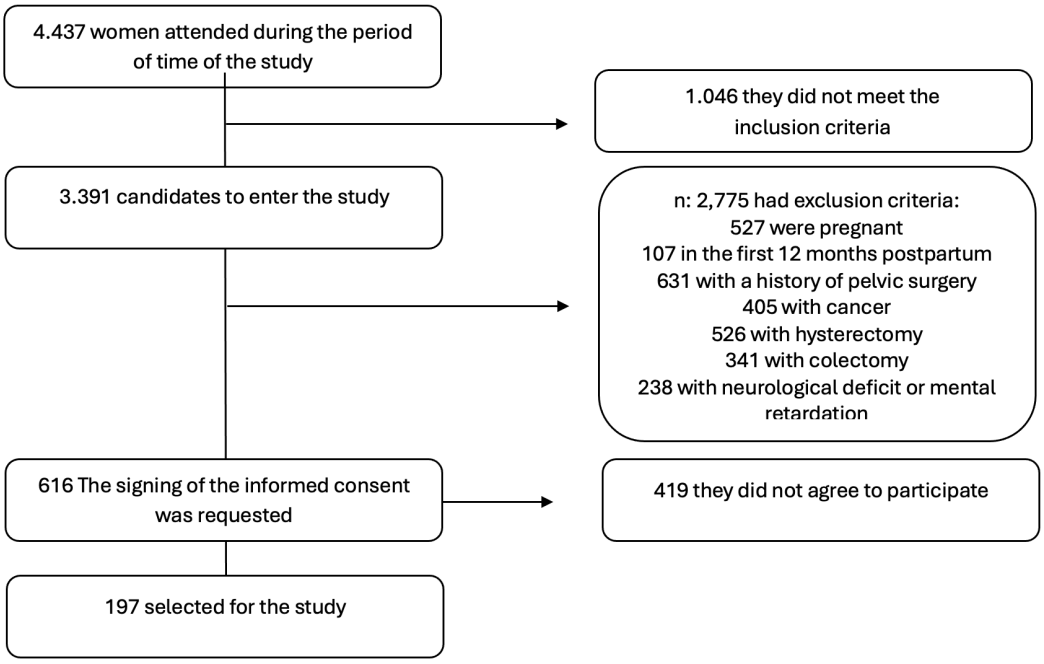
Intimate hygiene practices were also assessed, including hair removal, use of panty liners, tight clothing, type of underwear (cotton or nylon/lycra), use of menstrual cups, intimate soaps, and vaginal douching. Additionally, antibiotic use in the previous three months, use of intravaginal ovules, and use of home remedies were recorded. A subgroup analysis by age (pre- and post-menopause) was performed to compare the prevalence of cytolytic vaginosis between groups.

Statistical analysis: Data were processed and analyzed using IBM SPSS Statistics version 25.0. Quantitative variables are presented as medians and ranges, while qualitative variables are expressed as absolute and relative frequencies. The prevalence of cytolytic vaginosis was estimated, and its association with potential sociodemographic, behavioral, and sexual risk factors was explored through bivariate analysis using odds ratios (OR) and their corresponding 95% confidence intervals (95% CI).

Results

During the study period, 4,437 women with persistent vaginal discharge were evaluated in the outpatient gynecology clinics of the three participating institutions. Of these, 1,046 did not meet the inclusion criteria, 2,775 met exclusion criteria, and 419 declined to participate. Finally, 197 participants were included in the study (see Figure 1).

Figure 1. Flow diagram of the study population.



Source: own elaboration

Of the 197 participants, 87.81% professed the Catholic religion; 51.77% belonged to the subsidized regime, and 57.36% resided in urban areas. The average age was 34.68 ± 5.29 years (range: 18–83 years).

Eighteen point twenty-seven percent (18.27%) (n=36/197) of the participants were in menopause, with an average duration of 9.57 ± 3.82 years (range: 3–33 years). The mean age at menopause was 49.62 ± 7.85 years (range: 36–54 years). The use of hormone therapy was identified in 13.88%

of the menopausal women (n=5/36). Table 1 shows the sociodemographic characteristics of the participants.

Table 1. Sociodemographic characteristics of women studied for cytolytic vaginosis in the Coffee Axis, 2024, n=197

Variables	n (%)
Age, X±SD	34,68 ± 5,29 years
Age of the couple, X±SD	38,59 ± 6,71 years
Ethnic group	
White	106 (53,8 %)
Afrocolombian	77 (39,08 %)
Indigenous people	14 (7,1 %)
Level of schooling	
Primary	35 (17,76 %)
Secondary school	101 (51,26 %)
Technique	41 (20,81 %)
University students	20 (10,15 %)
Marital status	
Married	118 (59,89 %)
Common-law union	59 (29,94 %)
Single	15 (7,61 %)
Widows	5 (2,53 %)
Socioeconomic stratum	
High	65 (32,99 %)
Medium	99 (50,25 %)
Low	33 (16,75 %)
Occupation	
Housewives	87 (44,16 %)
Employees	54 (27,41 %)
Unemployed	32 (16,24 %)
Pensioners, n (%)	24 (12,18 %)

Source: own elaboration.

Regarding chronic disease history, the following conditions were identified: diabetes (14.72%; n=29/197), hypertension (35.53%; n=70/197), hypothyroidism (9.13%; n=18/197), dyslipidemia (11.67%; n=23/197), and osteoporosis (12.18%; n=24/197).

The mean body mass index (BMI) was 25.36 ± 1.97 kg/m^2 (weight: 67.84 ± 5.93 kg; height: 164.75 ± 2.36 cm). Obesity was observed in 60.91% of participants (n=120/197).

Regarding lifestyle factors, 19.28% (n=38/197) were smokers, 72.58% (n=143/197) reported alcohol consumption, and 4.56% (n=9/197) used psychoactive substances. Physical inactivity was identified in 70.55% (n=139/197).

In terms of sexual and reproductive health history, the mean age at first childbirth was 13.75 ± 2.48 years (range: 13–29 years), and the median parity was 3 children (range: 0–13). A total of 77.66% (n=153/197) had two or more deliveries.

Hormonal contraception use was reported in 61.92% (n=122/197). Oral contraceptives were the most common method (30.32%; n=37/122), followed by injectable contraceptives (24.59%; n=30/122) and subdermal implants (18.85%; n=23/122). Progesterone-based contraceptive use accounted for 48.36% (n=59/122).

Condom use was reported by 41.62% (n=82/197). A history of sexually transmitted infections was reported by 5.58% (n=11/197), including human papillomavirus (HPV) (n=5), genital herpes (n=4), and Trichomonas vaginalis infection (n=2).

Regarding sexual behavior, sexual orientation was predominantly heterosexual (84.77%; n=167/197). The mean age at sexual debut was 13.79 ± 2.57 years (range: 11–27 years). The number of sexual partners had a median of 7 (range: 2–>20).

A total of 29.94% (n=59/197) reported more than 10 years of cohabitation with a partner. The most frequent sexual practice was vaginal intercourse (100%), while the least frequent was anal intercourse (24.87%; n=49/197). Masturbation was reported as a habitual practice by 69.54% (n=137/197), and the use of sex toys was reported by 73.09% (n=144/197).

At the time of the interview, 6.59% (n=13/197) reported having at least two sexual partners (range: 2–5). A total of 38.57% (n=76/197) reported that their partner had been unfaithful, while 17.76% (n=35/197) admitted having been unfaithful at least once.

Regarding sexual frequency in the week prior to the interview (defined as the seven days preceding the survey), 62.94% (n=124/197) reported engaging in sexual activity three times per week (range: 1–7).

A high proportion of women (87.81%; n=173/197) had used antibiotics, and 80.71% (n=159/197) had used intravaginal ovules in the three months prior to the survey. Additionally, 58.88% (n=116/197) reported having sought medical care in the previous month due to vaginal discharge and

having received treatment with antibiotics or vaginal ovules.

A total of 15.22% (n=30/197) reported receiving four treatments in the past year for vaginal discharge (range: 2–8). Simultaneous oral and vaginal treatment was reported by 20.81% (n=41/197). Self-medication with antibiotics and ovules was observed in 72.58% (n=143/197).

Furthermore, 45.17% (n=89/197) reported using home remedies for vaginal discharge, including tea tree oil, coconut oil, sodium bicarbonate, calendula, turmeric, vaginal douching, probiotics, vaginal yogurt, and apple cider vinegar.

Among the 197 women, 36.54% (n=72/197) were diagnosed with bacterial vaginosis, 29.94% (n=59/197) with vulvovaginal candidiasis, 23.85% (n=47/197) with cytolytic vaginosis, 6.09% (n=12/197) with mixed vaginitis (bacterial vaginosis and vulvovaginal candidiasis), and 3.55% (n=7/197) with Trichomonas vaginalis infection.

In the subgroup analysis, the prevalence of cytolytic vaginosis among menopausal women was 36.11% (n=13/36), compared to 21.11% (n=34/161) in non-menopausal women.

When exploring the association between risk factors and cytolytic vaginosis, significant associations were found with the use of home remedies (OR = 10.1; 95% CI: 4.9–20.9), intimate hair removal (OR = 9.37; 95% CI: 4.7–18.6), infidelity (OR = 9.18; 95% CI: 3.7–22.7), and the use of progesterone-based contraceptives (OR = 8.78; 95% CI: 4.4–17.5) (see Table 2).

Table 2. Factors associated with cytolytic vaginosis in women from the Coffee Region, Colombia, 2024 (n=197)

Associated factors					
	With cytolytic vaginosis n= 47	**Without cytolytic vaginosis n= 150**	**OR**	**95% CI Lower – Upper**	**Value p**
Rural origin	25	39	3,23	1,7 – 6,3	0, 001
Multiparity	24	24	5,48	2,8 – 10,8	0, 00001
Diabetes	19	15	6,11	2,9 – 12,8	0,00001
Obesity	20	17	5,81	2,8 – 11,9	0,00001
Use of progesterone contraceptives	27	33	4,79	2,5 – 9,3	0,00001
Use of vaginal ovules	23	30	3,83	2,0 – 7,5	0, 00005
Use of antibiotics	24	30	4,17	2,1 – 8,2	0, 0001
Consumption of probiotics	12	30	1,37	0,6 – 3,1	0,546
Menopause	18	27	2,83	1,4 – 5,7	0, 0071
Use of menopausal hormone therapy	3	4	2,49	0,6 – 11,1	0,4536
Smoking	27	55	2,33	1,2 – 4,5	0, 0187
Alcohol intake	22	54	1,56	0,8 – 3,0	0, 2474
Use of psychoactive substances	6	11	1,85	0,7 – 5,2	0, 3899
Intimate depilation	29	28	7,02	3,6 – 13,8	0, 00001
Intimate soaps	36	49	6,75	3,3 – 13,7	0, 00001
Use of tampons	17	15	5,11	2,4 – 10,8	0, 0001
Use of pads	22	21	5,41	2,7 – 10,8	0, 00001
Use of menstrual cup	22	28	3,83	1,9 – 7,6	0,0002
Use of tight clothing	28	35	4,84	2,5 – 9,4	0, 00001
Vaginal douches	26	27	5,64	2,9 – 11,1	0, 00001
Home remedies	23	17	7,51	3,7 – 15,2	0, 00001
Use of condom	5	45	0,28	0,1 –0,7	<0,05
Use of cotton underwear	6	44	0,35	0,1 – 0,9	0, 0370
Onset of sexual activity <13 years	15	11	5,92	2,7 – 13,2	0, 00005
Homosexuality	6	11	1,85	0,7 – 5,2	0, 3899
Frequency of sexual relations per week ≥3	13	15	3,44	1,5 – 7,7	0,0053
Anal intercourse	5	14	1,16	0,4 – 3,4	0, 9851
Use of sex toys	17	27	2,58	1,3 – 5,3	0, 0160
Infidelity	13	8	6,79	2,9 – 16,2	0,00005
History of sexually transmitted infections	11	7	6,24	2,5 – 15,7	0, 0005

Source: own elaboration

Discussion

In this study, a prevalence of cytolytic vaginosis of 23.85% was found, higher among menopausal women (36.11%) compared to non-menopausal women (21.11%) ($p<0.05$). Additionally, the use of home remedies (OR = 7.51; 95% CI: 3.7–15.2), intimate hair removal (OR = 7.02; 95% CI: 3.6–13.8), and infidelity (OR = 6.79; 95% CI: 2.9–16.2) were identified as risk factors associated with the presence of cytolytic vaginosis.

The high prevalence observed in this study may be explained by the characteristics of the study population, as participants were recruited based on the presence of persistent vaginal discharge. Furthermore, practices commonly perceived as intimate hygiene measures may actually constitute risk factors, such as intimate hair removal, use of panty liners, vaginal douching, tampons, and intimate soaps, among others.

Regarding prevalence findings, the results of this study are similar to the 19.4% reported in a study that included 140 women (15). Notably, in China, a study of 484 women with recurrent vulvovaginitis reported a prevalence of cytolytic vaginosis of 26.7% (18), which is comparable to our findings.

In contrast, a lower prevalence has been reported in Bulgaria in a study of 1,152 patients with symptoms similar to vulvovaginal candidiasis (19). These differences may be explained by variations in sociodemographic and cultural characteristics, as well as current limitations in the understanding of cytolytic vaginosis.

The risk factors associated with cytolytic vaginosis identified in this study are consistent with those reported in an anonymous online survey conducted in Canada, which included 1,435 participants over 18 years of age (20). This study found that the use of vaginal or genital products as part of hygiene practices was associated with an increased risk of adverse vaginal conditions (OR = 3.2; 95% CI: 2.4–4.2; $p<0.01$).

These findings are also consistent with reports from African and Asian populations, where vaginal practices are neither rare, exotic, nor as harmless as often assumed (21).

It is important to consider that the vaginal microbiome is a dynamic and sensitive microenvironment that can be affected by various events, interventions, and health-related behaviors, such as antibiotic use, sexual activity, and behavioral practices (e.g., vaginal douching, contraceptive methods, intimate hair removal, among others) (22–24). In this context, there is a need to strengthen population-level education and awareness regarding

the potential risks of these practices among women who use intimate hygiene products.

The main strength of this study lies in being the first in Colombia to evaluate cytolytic vaginosis, a clinical condition that, despite its significant prevalence, remains underrecognized. Among its limitations are those inherent to the cross-sectional design and the lack of inclusion of additional variables that could influence the behavior of risk factors.

The findings of this study provide relevant evidence to support strategies aimed at the rational use of antibiotics (oral and vaginal formulations), as well as to discourage self-medication in the presence of vaginal discharge, in order to avoid inappropriate therapies that may be harmful to the vaginal microbiota. Additionally, they highlight the importance of promoting healthy habits and lifestyles that help preserve the balance of the vaginal microbiome, preventing alterations that may become risk factors for future infections.

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