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Incidence of Endometrial Polyp in Postmenopausal Patient Undergoing Diagnostic Hysteroscopy, with prior Ultrasound Indicating Endometrial Thickening: Prospective Study

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HIGHLIGHTS

What is already known?

- Endometrial polyps are common in postmenopause and increase the risk of cancer.
- TVUS is limited in identifying EP, often only detecting endometrial thickening.
- Diagnostic hysteroscopy has advantages, such as biopsy and removal of lesions.

What has been shown?

- 252 patients, aged 38 to 82 years, of whom 141 were postmenopausal (55%).
- 79 had endometrial thickening on TVUS, and 62 had EP on Diagnostic hysteroscopy
- Only 21% had a prior diagnosis of polyp on TVUS, which was confirmed by DH.

How can the study contribute to the literature?

- Endometrial thickening on TVUS was associated with EP diagnosis on hysteroscopy
- Hysteroscopy performs better than TVUS in identifying polypoid lesions
- Improving the investigation of endometrial thickening with hysteroscopy

ABSTRACT

Introduction: Endometrial polyps (EP) are prevalent in postmenopausal women and represent a risk factor for endometrial cancer. Transvaginal ultrasonography (TVUS) has limited accuracy in identifying EP, often resulting only in the detection of endometrial thickening. Diagnostic hysteroscopy (DH), however, is more effective and allows for biopsy and removal of lesions.

Objective: To assess the prevalence of EP in patients undergoing hysteroscopy with a prior diagnosis of endometrial thickening on TVUS. **Methodology:** This is a prospective observational cross-sectional study conducted at a University Hospital in Belo Horizonte, which included postmenopausal women who underwent DH between October 2023 and June 2024. **Results:** Data collection encompassed 252 patients, aged 38 to 82 years, of whom 141 were postmenopausal (55%). Among these, 79 exhibited endometrial thickening on TVUS, and 62 (78.5%) were diagnosed with polyps upon DH. Of these, 69% had endometrial thickening between 6-10 mm, and 30% had thickening greater than 10 mm on US. Only 21% of the patients had a prior diagnosis of polyps on TVUS, which was confirmed by DH. Among these, approximately 45% experienced pelvic pain, 34% reported abnormal uterine bleeding (AUB), and 39% were asymptomatic. Following the examinations, 49% were referred for surgical hysteroscopy, 25% for biopsy, and 1.6% had inconclusive results. **Conclusion:** The study confirms a statistically significant association between endometrial thickening on TVUS and the diagnosis of EP on hysteroscopy, highlighting the superiority of DH over TVUS for polyp diagnosis and emphasizing the importance of this gold-standard examination.

Keywords: Hysteroscopy; Ultrasound; Postmenopause; Endometrium; Thickening.

Abbreviations: EP: Endometrial polyp; TVUS: Transvaginal ultrasound; DH: Diagnostic hysteroscopy; AUB: Abnormal uterine bleeding

INTRODUCTION

Endometrial polyps (EP) are focal projections of the endometrium secondary to hyperplasia of endometrial glands and stroma around a vascular core. These polyps may be sessile or pedunculated, multiple or solitary, and exhibit varying proportions of glands, connective tissue, and blood vessels.^{1,2} This uterine pathology is common, and although it has a low malignancy rate, it constitutes a significant risk factor for endometrial cancer, underscoring the importance of comprehensive studies on EP and their manifestations.³ Major risk factors for the development of endometrial polyps include advanced age, nulliparity, early menarche, late menopause, obesity, diabetes, hypertension, and tamoxifen use.⁴

Patients with endometrial polyps are predominantly asymptomatic; when symptoms do occur, the most common manifestation is abnormal uterine bleeding. Other associated symptoms include abdominal pain, pelvic pain, or infertility. Approximately one in four women of reproductive age with abnormal bleeding will have endometrial polyps within the uterine cavity.⁵ EP accounts for 21% to 28% of all cases of postmenopausal uterine bleeding, making them a relevant differential diagnosis for endometrial cancer.⁶

Transvaginal ultrasonography (TVUS) is recommended as the initial screening method for patients with abnormal uterine bleeding in the postmenopausal period or asymptomatic patients. This examination is favored due to its less invasive nature, low cost, and relative accessibility.⁷ However, this method is examiner and equipment-dependent, which can diminish its efficacy in the assessment and accurate diagnosis of the uterine cavity. A study evaluating the accuracy of transvaginal ultrasonography in assessing intrauterine lesions based on hysteroscopic diagnosis showed an accuracy of 52.8% in diagnosing polyps via ultrasound ($p = 0.025$).⁸ Moreover, the examination does not allow for unequivocal differentiation between en-

dometrial images of polyps, hyperplasias, and proliferative changes resulting from hormonal therapy, making it difficult to determine with certainty the nature of the uterine abnormality.⁹

Both EP and endometrial cancer can frequently present as nonspecific and heterogeneous endometrial thickening on TVUS.¹⁰ Therefore, it is crucial to identify the cut-off point for endometrial thickness that may indicate a polyp or neoplasia, to guide the patient towards diagnostic hysteroscopy (DH) appropriately. Two meta-analyses concluded that the most clinically significant result was that the likelihood of cancer in women with an endometrial thickness of 5 mm or less was 1%.^{10,11}

Women with an endometrial thickness of 5 mm or greater should undergo investigation of the uterine cavity through diagnostic hysteroscopy, particularly postmenopausal patients with abnormal uterine bleeding.^{12,13} DH is considered the gold standard in the literature for diagnosing uterine diseases, as it provides a direct view of the uterine cavity and allows for targeted biopsies, improving the accuracy of intrauterine lesion diagnosis, especially focal lesions. However, as an invasive procedure, it is not recommended as the first option for all patients¹⁴.

Currently, the primary area of investigation using DH has been the diagnosis of endometrial thickening detected by TVUS. A statistically significant relationship has been found between the indication for DH due to endometrial thickening, whether focal or diffuse, and the presence of endometrial polyps ($p = 0.001$). Consequently, hysteroscopy demonstrated a higher sensitivity (S) for detecting endometrial polyps (91.8%).¹⁵

Given the high incidence of endometrial polyps in perimenopausal women, particularly in the postmenopausal period, and the diagnostic limitations of TVUS, it is important to establish the true incidence of polyps in ultrasonographic findings of endometri-

al thickening. Diagnosing a polyp via DH allows for biopsy of the suspected area and complete removal of the lesion, potentially excluding the risk of neoplastic transformation and resolving any symptoms the patient may present with.^{14,16}

The objective of this study was to evaluate the prevalence of endometrial polyps in postmenopausal patients undergoing diagnostic hysteroscopy after presenting endometrial thickening detected via transvaginal ultrasound. By analyzing the incidence of EP in this specific population, the research aimed to highlight the limitations of TVUS in diagnosing EP and to reinforce the role of DH as a gold standard for identifying and managing intrauterine lesions, enabling targeted biopsies and therapeutic interventions when necessary.

METHOD

Study design

This is a prospective, cross-sectional observational study conducted by analyzing data collected from patients using the public health system (SUS) who underwent diagnostic hysteroscopy at a university hospital in Belo Horizonte, Brazil. The study was conducted over six non-consecutive months within the Outpatient Hysteroscopy Service offered by the Postgraduate Program in Minimally Invasive Gynecology Hysteroscopy at the University Hospital. Only patients who agreed to participate and signed the Informed Consent Form (ICF) were included in the research. It is important to note that the study was approved by the Research Ethics Committee (REC) under CAAE no. 71102123.30000.5134 before data collection began. Additionally, ethical principles were observed in accordance with Resolution 466/12 of the National Health Council.

Sample Calculation:

To estimate the study size, it was projected that 270 patients would be attended by the Hysteroscopy Service at HUCM-MG during the study period, considering an average of 45 patients per monthly module. The research only included patients who met the inclusion criteria. It is noteworthy that the service operates from April to December, with interruptions in January, February, and March. Thus, data collection was performed over six non-consecutive months during the funding period.

Participants:

The sample consisted of patients using the public health system (SUS) who underwent diagnostic hysteroscopy at the University Hospital between October 2023 and June 2024. The inclusion criteria targeted postmenopausal women. Patients under 18, those without evidence of endometrial thickening on transvaginal ultrasound (TVUS), and those who did not physically present TVUS results on the day of data collection were excluded.

Over the six-month data collection period, information was obtained from 252 patients. Of these, 141 met the inclusion criterion of being postmenopausal, and 79 had previous evidence of endometrial thickening on TVUS.

Instruments and Procedures

Data collection relied on a pre-exam clinical form, which included a questionnaire completed by patients before the hysteroscopy, and a hysteroscopic findings chart filled out after the examination with assistance from the attending physicians. The Informed Consent Form (ICF), detailing risks, benefits, data security measures, and study objectives, was provided to and signed by patients meeting the inclusion criteria. Additionally, an Excel spreadsheet was used to record all categorical variables relevant to the study, with collected data transferred monthly by the authors.

The pre-exam clinical form captured information such as age, reproductive cycle phase, date of last menstruation, parity, delivery route, comorbidities, medication use, allergies, prior uterine surgeries, complaints, infertility, available ultrasound findings, and respective observations.

Based on this form, all patients undergoing hysteroscopy were screened. Patients filled out the questionnaire, and their responses were provided to the physicians conducting the procedure.

After screening, hysteroscopy was performed, and the findings were recorded in the hysteroscopic findings chart with the help of postgraduate students. At the end of each shift, the authors collected pre-exam clinical forms and hysteroscopy results. Data from patients with endometrial thickening who signed the ICF were transferred monthly to the Excel spreadsheet. Additionally, clinical management steps, such as referrals for surgical hysteroscopy, biopsy procedures, outpatient follow-ups, or second-look examinations, were documented. At the end of the six-month collection period in June 2024, the authors reviewed the spreadsheet, and statistical analysis was initiated.

Statistical Analysis

Data analysis involved simple frequencies and percentages to describe the distribution of information across different categories. Frequency tables were created to organize and present data clearly and concisely, with column charts used for visual representation. For summary measures, the median and interquartile range were calculated to describe the central tendency and dispersion of the data.

Furthermore, statistical tests were applied to obtain deeper insights. The Wilcoxon signed-rank test was used to compare medians of two related groups and assess significant differences. Fisher's exact test was employed to analyze associations between two categorical variables in contingency tables, particularly when expected frequencies were low. Both tests provided important insights into relationships and differences between variables in this study.

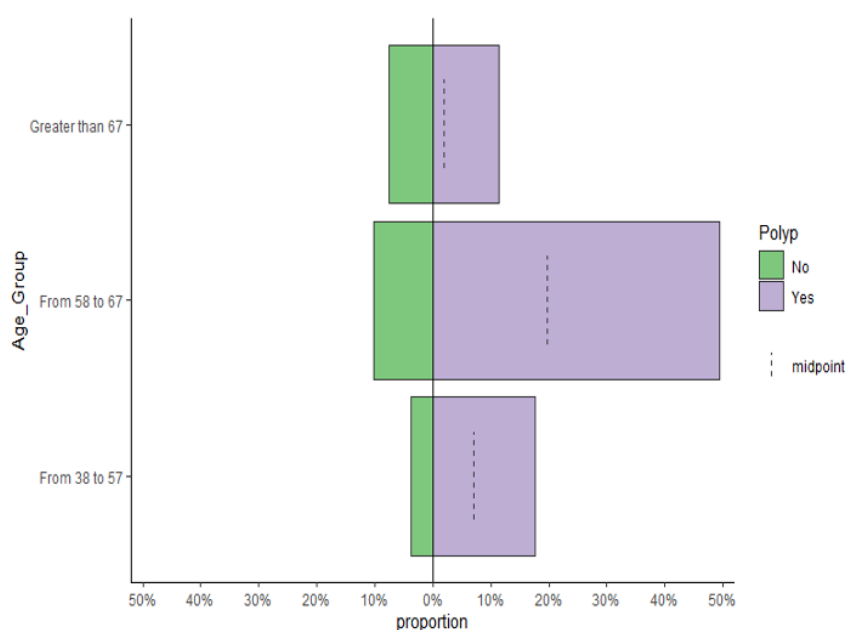
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RESULTS

The data collection conducted over one year obtained information from 252 patients. Among these patients, 141 are in the menopause period, which accounts for 55% of the total sample. Of these 141 patients, 79 presented endometrial thickening on Transvaginal Ultrasound, and 62 (78.5%) were diagnosed with a polyp during the Diagnostic Hysteroscopy, which is the sample used for analysis in the study.

Analyzing the group of women selected by these clinical criteria, the age of the group ranged from 38 to 82, with an average age of 62, as shown in Figure 1.



Additionally, 91% of the sample had at least one pregnancy, with the highest prevalence of two pregnancies (28%). Among the pregnant women, 66% delivered vaginally, and 34% underwent cesarean sections. 21% of the patients had previously experienced a miscarriage

Table 1. Characterization of the sample with positive endometrial thickening in the US.

Characteristics	Total N N = 79 ¹	No N = 17 ¹	Yes N = 62 ¹	p ² value (p0.041)
Age	62 (58, 67)	66 (61, 68)	62 (58, 65)	0.037
Class_Age				0.2
From 38 - 57	17 (22%)	3 (18%)	14 (23%)	
From 58 - 67	47 (59%)	8 (47%)	39 (63%)	
> 67	15 (19%)	6 (35%)	9 (15%)	
Climacterium				
Yes	79 (100%)	17 (100%)	62 (100%)	
Pregnancy				0.3
No	7 (9.1%)	0 (0%)	7 (12%)	
Yes	70 (91%)	17 (100%)	53 (88%)	
Normal birth				0.9
No	26 (34%)	6 (35%)	20 (33%)	
Yes	51 (66%)	11 (65%)	40 (67%)	
Cesarean Section				0.3
No	45 (58%)	8 (47%)	37 (62%)	
Yes	32 (42%)	9 (53%)	23 (38%)	
Abortion				0.037
No	61 (79%)	10 (59%)	51 (85%)	
Yes	16 (21%)	7 (41%)	9 (15%)	
Without symptoms				0.002
No	55 (70%)	17 (100%)	38 (61%)	
Yes	24 (30%)	0 (0%)	24 (39%)	
Abnormal Uterine Bleeding				0.026
No	44 (59%)	6 (35%)	38 (66%)	
Yes	31 (41%)	11 (65%)	20 (34%)	
Pelvic pain				0.8
No	42 (56%)	10 (59%)	32 (55%)	
Yes	33 (44%)	7 (41%)	26 (45%)	
Vaginal Discharge				0.13
No	72 (96%)	15 (88%)	57 (98%)	
Yes	3 (4.0%)	2 (12%)	1 (1.7%)	
Infertility				>0.9
No	74 (100%)	16 (100%)	58 (100%)	
Yes	0 (0%)	0 (0%)	0 (0%)	
US available				
Yes	79 (100%)	17 (100%)	62 (100%)	

Uterine position				0.011
AVF	55 (77%)	8 (50%)	47 (85%)	
Not informed	4 (5.6%)	2 (13%)	2 (3.6%)	
RVF	12 (17%)	6 (38%)	6 (11%)	
Volume	50 (32, 81)	50 (34, 91)	50 (32, 77)	>0.9
Interval of Volume				0.5
Altered	54 (69%)	13 (76%)	41 (67%)	
Normal	24 (31%)	4 (24%)	20 (33%)	
Endometrial Thickness	8.3 (6.7, 11.6)	9.0 (5.6, 10.6)	8.3 (7.0, 11.7)	0.8
Interval Thickness				0.4
Altered	76 (97%)	16 (94%)	60 (98%)	
Normal	2 (2.6%)	1 (5.9%)	1 (1.6%)	
Class of Thickness				0.4
0 - 5 mm	2 (2.6%)	1 (5.9%)	1 (1.6%)	
6 - 10 mm	52 (67%)	10 (59%)	42 (69%)	
> 10 mm	24 (31%)	6 (35%)	18 (30%)	
Polyp at US?				>0.9
No	63 (80%)	14 (82%)	49 (79%)	
Yes	16 (20%)	3 (18%)	13 (21%)	
Thickness at US				>0.9
No	0 (0%)	0 (0%)	0 (0%)	
Yes	79 (100%)	17 (100%)	62 (100%)	
Indication of Hysteroscopy due to polyp or thickening at us?				>0.9
No	0 (0%)	0 (0%)	0 (0%)	
Yes	79 (100%)	17 (100%)	62 (100%)	
Cavity without change				0.002
No	75 (95%)	13 (76%)	62 (100%)	
Yes	4 (5.1%)	4 (24%)	0 (0%)	
Adenomyosis				0.5
No	76 (96%)	16 (94%)	60 (97%)	
Yes	3 (3.8%)	1 (5.9%)	2 (3.2%)	
Submucous myoma				>0.9
No	75 (95%)	16 (94%)	59 (95%)	
Yes	4 (5.1%)	1 (5.9%)	3 (4.8%)	
Intramural myoma				>0.9
No	79 (100%)	17 (100%)	62 (100%)	
Yes	0 (0%)	0 (0%)	0 (0%)	
Lesion suggestive of malignancy				0.044
No	77 (97%)	15 (88%)	62 (100%)	
Yes	2 (2.5%)	2 (12%)	0 (0%)	

Uterine Cervical Stenosis				>0.9
No	56 (71%)	12 (71%)	44 (71%)	
Yes	23 (29%)	5 (29%)	18 (29%)	
Size of the uterine cavity				0.4
Increased	1 (1.4%)	0 (0%)	1 (1.8%)	
Diminished	12 (17%)	4 (29%)	8 (14%)	
Normal	57 (81%)	10 (71%)	47 (84%)	
Exam Inconclusive / Interrupted?				0.12
No	76 (96%)	15 (88%)	61 (98%)	
Yes	3 (3.8%)	2 (12%)	1 (1.6%)	
Referral for surgical hysteroscopy				0.006
No	46 (59%)	15 (88%)	31 (51%)	
Yes	32 (41%)	2 (12%)	30 (49%)	
Biopsy				0.8
No	58 (74%)	12 (71%)	46 (75%)	
Yes	20 (26%)	5 (29%)	15 (25%)	
Ambulatorial Referral				<0.001
No	74 (94%)	12 (71%)	62 (100%)	
Yes	5 (6.3%)	5 (29%)	0 (0%)	
Second look				>0.9
No	79 (100%)	17 (100%)	62 (100%)	
Yes	0 (0%)	0 (0%)	0 (0%)	

¹Median (Q1, Q3); n (%)

²Wilcoxon rank sum test; Fisher's exact test; Chi-square test of independence

Regarding the results presented by the sample on USTV, 85% (p-value 0.011) showed the uterus in anteverted flexion (AVF), and in 67%, an altered uterine cavity volume was observed. Regarding endometrial thickness values, a measurement greater than 5 mm on TVUS was considered abnormal, based on the findings reported in the article by Guimarães LC. 1.6% of the sample had values between 1-5 mm, 69% had values between 6-10 mm, and 30% had values greater than 10 mm. Only 21% of the patients had a prior finding of a polyp on USTV, confirmed by diagnosis during HD.

Regarding the main symptom experienced by the patients with the endometrial thickening on US, followed by the polyp diagnosis at hysteroscopy, approximately 45% of the women reported pelvic pain, 34% complained of abnormal uterine bleeding (AUB), 39% were asymptomatic, and 1.7% had vaginal discharge. No patients presented associations with infertility.

As for the findings in the Diagnostic Hysteroscopy of the studied sample, 29% of the patients had cervical stenosis, 3.2% had an examination suggestive of adenomyosis, and 4.8% were diagnosed with submucosal fibroids. Regarding the uterine cavity size, 84% showed no changes, 14% had a decreased cavity size, and 1.8% had an increased size. No patient in the sample showed lesions suggestive of malignancy; however, among the patients who presented thickening on USTV, regardless of polyps in HD, 12% had lesions suggestive of malignancy.

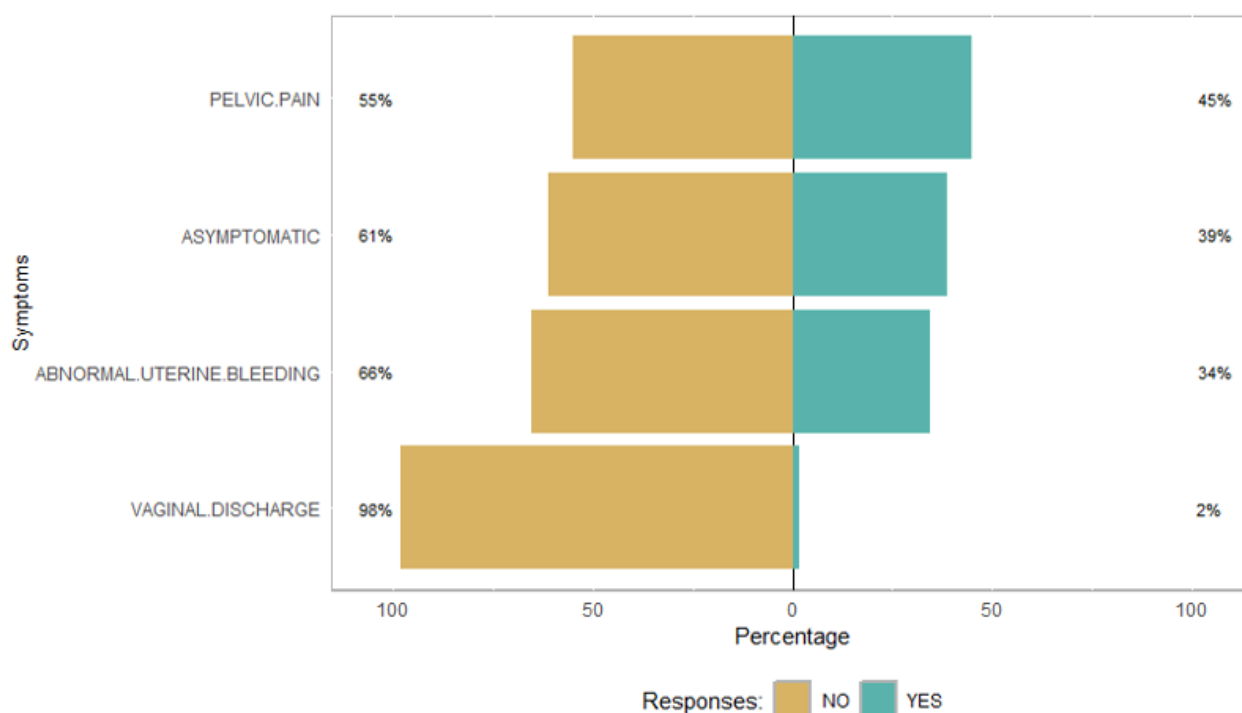
Regarding the actions taken after the examination, 49% were referred for surgical hysteroscopy for polyp removal (p-value 0.006), 25% were referred for biopsy, and there were no referrals for outpatient follow-up or a second look at the examination. It is worth noting that 1 patient (1.6%) had the examination interrupted or obtained inconclusive results, with the main reason being patient discomfort.

DISCUSSION

The results of the data analysis in this study confirmed that Hysteroscopy is the most accurate method for diagnosing endometrial polyps in postmenopausal patients, compared to Transvaginal Ultrasound (TVUS). Statistical significance was found in patients with endometrial thickening detected by TVUS and the diagnosis of endometrial polyps via Hysteroscopy, indicating greater precision when using Hysteroscopy.

The main symptoms presented by the patients analyzed were pelvic pain, followed by abnormal uterine bleeding (AUB), which differs from what was described by Mansour T, et al., who claimed that the majority of patients were asymptomatic and that when symptoms were present, the main finding associated with endometrial polyps was AUB.⁵ This data leads us to question the hypothesis of underestimating the pain felt and, as a consequence, reported by several patients. However, pain is subjective and individual, making it challenging to measure and categorize as a symptom of a specific pathology.

Figure 2. Symptoms Chart Presented by the patients

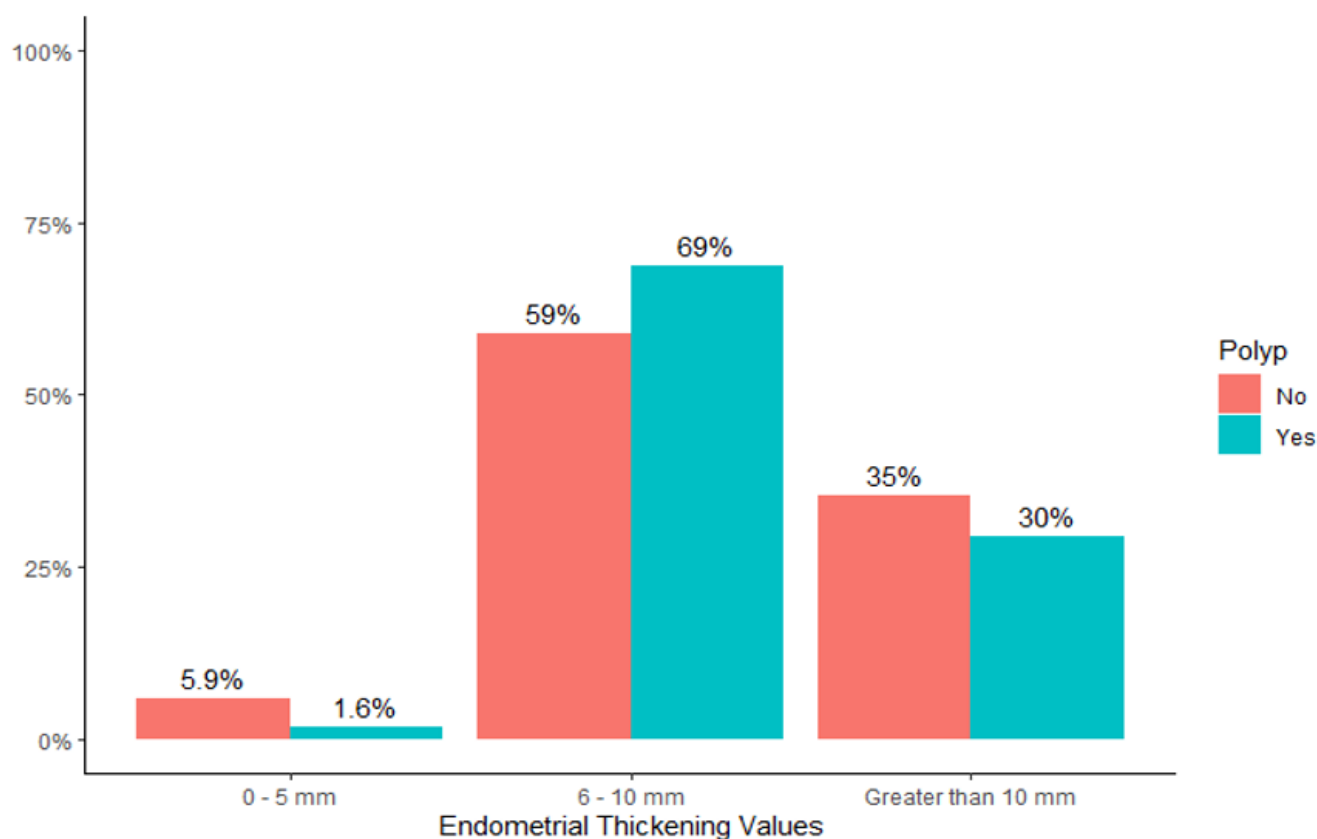


It was observed that 88% of the sample had at least one pregnancy, indicating a possible association between pregnancy and the presence of polyps in postmenopausal women. Furthermore, this pathology was prevalent in women who had vaginal delivery compared to cesarean section. However, no association between pregnancy and the incidence of endometrial polyps has been described in the literature.

Moreover, regarding endometrial thickening, the results obtained from Guimarães LC's article considered a reference value of 1 to 4.9 mm as normal and greater than 5 mm as altered in ultrasound, requiring referral for Hysteroscopy. Regarding uterine volume, a reference value within the normal range of 50 to 90 cm³ (or mL) was described.¹⁷

However, endometrial thickness observed in postmenopausal women via TVUS is variable. In TVUS, both endometrial polyps and endometrial cancer can frequently present as nonspecific and heterogeneous endometrial thickening.¹¹ In the present study, the average thickness found was 8.3 mm, regardless of the presence of polyps on Hysteroscopy, which may be a risk factor for the development of the aforementioned pathologies, making it important to follow up with the most accurate diagnostic test.

Figure 3. Distribution of endometrial thickening on TVUS and presence of polyps on Hysteroscopy.



The study by Smith-Bindman, which sought to determine the endometrial thickness that increases the risk of carcinoma in postmenopausal women, established that a finding above 11 mm represents a 6.7% risk of cancer, and therefore, a biopsy should be considered. In contrast, women with an endometrial thickness of up to 11 mm on TVUS have a very low risk of carcinoma.^{4,11,18} In this study, no statistical significance was found between endometrial thickening greater than 10 mm and polyps with lesions suggestive of malignancy. However, lesion excision was performed in 25% of the patients, and the material was sent for histopathological evaluation.

Table 2. Cross-tabulation for positive endometrial thickening on TVUS and positive endometrial polyps on hysteroscopy.

PRESENCE OF POLYPS

Characteristics	Total N N = 117 ¹	No N = 32 ¹	Yes N = 85 ¹	p-value ²
Thickening on US				0.041
No	38 (32%)	15 (47%)	23 (27%)	
Yes	79 (68%)	17 (53%)	62 (73%)	

¹ n (%)² Chi-square test of independence

Data analysis shows a statistically significant association ($p\text{-value} = 0.041$) between the presence of polyps and thickening on ultrasound (US). Out of the 117 individuals evaluated, 32 (27%) did not have polyps, of which 15 (47%) did not have thickening on US and 17 (53%) did. Among the 85 individuals (73%) with polyps, 23 (27%) did not present thickening on US, while 62 (73%) did. Therefore, the presence of polyps is associated with a higher frequency of thickening on US, with 73% of individuals with polyps showing this finding, compared to 53% of those without polyps.

Finally, it was possible to analyze that the true incidence of polyps in the presence of thickening on US was 73%, indicating a significant association between patients who presented endometrial thickening on transvaginal ultrasound and were diagnosed with endometrial polyps on hysteroscopy ($p\ 0.041$). Thus, it cannot be stated that there is compatibility between the results of these two diagnostic methods, highlighting the importance of performing hysteroscopy, the gold standard examination, which is consistent with findings in the medical literature.

LIMITATIONS

This study has limitations and biases that must be acknowledged. The assessment of endometrial thickening was subjective, with thresholds based on reference articles defining 1 to 5 mm as normal and greater than 5 mm as abnormal, which requires further investigation; however, this measurement depends on the examiner and the ultrasound equipment, limiting the ability to verify the accuracy of patient-reported data. Additionally, many patients had difficulty answering the questionnaire due to low education levels, leading the authors, in some cases, to guide responses by asking more specific questions. Poorly formulated answers further complicated converting subjective information into the objective data needed for the collection spreadsheet. Furthermore, the study was conducted on a limited sample of 140 patients, and some results may differ across different populations or in studies with larger sample sizes.

CONCLUSION

This study confirmed a high prevalence of anticholinergic medication use among the elderly, particularly when BAS was applied. Given the extensive evidence that anticholinergic burden adversely impacts health, leading to both central and peripheral side effects⁵, including unfavorable clinical outcomes such as cognitive and functional decline, hospitalization, and death, there is a clear need to minimize anticholinergic burden in at-risk populations. The implementation of these preventive strategies at primary healthcare levels is a crucial step toward mitigating the risks of iatrogenesis and providing more effective and safer care for the elderly population²⁷.

National literature still lacks well-validated scales that consider both the pharmacopoeia and the demographic and clinical characteristics of the Brazilian elderly population. The creation and validation of such tools would be pivotal for clinical practice, allowing healthcare professionals to accurately assess the anticholinergic potential of medications before prescribing them to older adults. The scarcity of specific data and tailored tools for the local context is becoming increasingly relevant as the Brazilian population ages rapidly, leading not only to heightened health risks for the elderly but also to increased healthcare costs, including those associated with hospitalizations, home care, and other services.

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THE AUTHORS DECLARE NO KNOWN FINANCIAL OR PERSONAL CONFLICTS OF INTEREST THAT COULD HAVE INFLUENCED THE PROJECT REPORTED IN THIS ARTICLE.