

# Ultrasound detection of endometrial cancer in women with postmenopausal bleeding

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## Abstract

**Background:**Endometrial cancer (EC) is the most common gynecological cancer and has an increasing incidence in postmenopausal women.**Aim of the work:**The role of endometrial thickness measured by transvaginal sonography in the detection of endometrial carcinoma in women with post menopausal bleeding.**Methods:**A cross sectional study that was conducted on 120 women with postmenopausal bleeding admitted to obstetrics & Gynecology department at Zagazig University hospitals through the period from September 2018 to September 2019.All cases were subjected to full history, full clinical examination, transvaginalsonography and diagnostic endometrial biopsy was taken for histopathological examination.**Results:**TVS evaluation of ET of the studied cases ranged from 1 to 20 mm with mean 9.65 mm. Also 48.3% of the cases had endometrial thickness more than 10 mm, 34.2% had less than 5 mm and 17.5% had from 5 to 10mm.that 34.2% of the studied cases had atrophic endometritis, 26.7% had endometrial polyp, 17.5% had simple hyperplasia, 7.5% had atypical hyperplasia and 14.2% had endometrial adenocarcinoma.**Conclusions:**TVS evaluation of endometrial thickness is not sensitive enough to detect cancer of endometrium and therefore couldn't replace histological evaluation of the endometrial tissue in women with postmenopausal bleeding.

**Key words:**Endometrial thickness, EC, Abnormal uterine bleeding

## I. INTRODUCTION

Endometrial cancer (EC) is the most common gynecological cancer and has an increasing incidence in postmenopausal women<sup>[1]</sup>.Endometrial cancer represents 3.6% of all new cancer cases in United States with mortality rate reaches 1.9% of all cancer death<sup>[2]</sup>.

Postmenopausal bleeding (PMB) is highly suspicious of being assigned of presence of endometrial cancer or pre malignant lesions. Nearly every endometrial cancer patients report PMB at some point and around 5-12% of PMB results from endometrial cancer<sup>[3]</sup>.PMB is early symptom of endometrial cancer leads to its detection in earlier stages with subsequently better outcomes<sup>[4]</sup>.

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Endometrial thickness (ET) is measured by transvaginal ultrasonography as the maximum anterior-posterior thickness of the endometrial echo on along axis transvaginal view of the uterus<sup>[5]</sup>. Women with postmenopausal bleeding and endometrial thickness <5mm measured with TVS have low risk of endometrial cancer<sup>[6]</sup>. While sonographic endometrial thickness  $\geq 5$ mm is associated with high risk of endometrial cancer in women with postmenopausal bleeding<sup>[7]</sup>. This study aimed to evaluate the role of TVS in diagnosis of endometrial cancer in women with postmenopausal bleeding.

## II. METHODS:

This cross sectional study included 120 women with postmenopausal bleeding admitted to obstetrics & Gynecology department at Zagazig University hospitals through the period from September 2018 to September 2019. **Inclusion criteria:** Females patients with postmenopausal bleeding (permanent cessation of menstruation for 1 year). **Exclusion criteria:** A symptomatic postmenopausal women. Postmenopausal ladies on hormone replacement therapy. Patients with already known malignancies. Patients with thyroid disorders. Patients with systemic blood disease.

Written informed consent was obtained from all participants and the study was accepted by the Research Ethics Committee of the Faculty of Medicine, Zagazig University. Study has been carried out on experiments involving human subjects in compliance with the Code of Ethics of the World Medical Association (Declaration Helsinki).

All cases were subjected to full history, full clinical examination; general, abdominal and pelvic examination to assess general condition of the patient and possible detection of local cause of vaginal bleeding, to examine size of uterus, affection of adnexa and parametrium. Laboratory Investigations included CBC, Coagulation profile, LFT, KFT, RBS, Urine analysis.

All patient have received transvaginal ultrasound using (Voluson 730 proV unit, GE medical systems, Zipg, Austria) ultrasound machine with 20 endovaginal probe with frequency 7 MHz to measure endometrial thickness and evaluate endometrial morphology. TVS for evaluation of size and contour of uterus, and endometrial thickness in mm. Measurement of endometrium was obtained in exact midsagittal plane excluding subendometrial sonolucent area. Parameters to be recorded as thickness, texture, abnormal focal lesions.

Patients were divided according to endometrial thickness into 3 categories;

Category A: patients with Et less than 5 mm.

Category B: Patients with ET from 5 mm to 10 mm.

Category C: Patients with ET more than 10 mm.

### **Operative design:**

Diagnostic curettage or Hysteroscopic guided biopsy was done for histopathological examination. All data was be subjected to statistical analysis.

### Statistical Analysis:

Data collected throughout history, basic clinical examination, laboratory investigations and outcome measures coded, entered and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) (Statistical Package for the Social Sciences) software for analysis.

### III. RESULTS:

**Table (1): Demographic data of the studied cases:**

Variable	(n=120)	
<b>Age: (year)</b>	Mean $\pm$ SD	57.73 $\pm$ 6.67
	Range	48 - 74
<b>BMI: (kg/m<sup>2</sup>)</b>	Mean $\pm$ SD	32.73 $\pm$ 3.11
	Range	24 - 39
Variable	N	%
<b>Parity:</b>	0	1.7
	2 – 4	76.6
	5 - 7	21.7

Sd: Standard deviation

This study showed that the age of the studied cases ranged from 48 to 74 years with mean 57.73 years. Regarding BMI it ranged from 24 to 39 kg/m<sup>2</sup> with mean 32.73 kg/m<sup>2</sup>. Finally 76.6% had parity between 2 to 4 timestable 1.

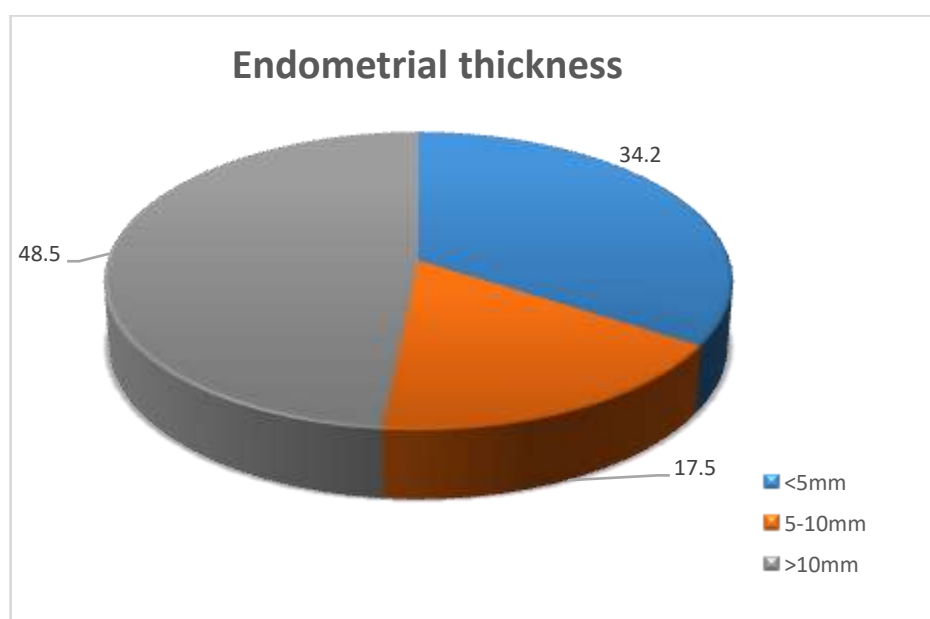
**Table (2): History of the studied cases:**

Variable	(n=120)
<b>Duration of menopause: (Years)</b>	
Mean $\pm$ SD	7.21 $\pm$ 5.40
Median	5.5
Range	1 - 22
<b>Duration of bleeding: (days)</b>	
Mean $\pm$ SD	29.76 $\pm$ 24.97
Median	21
Range	2 - 90

Sd: Standard deviation

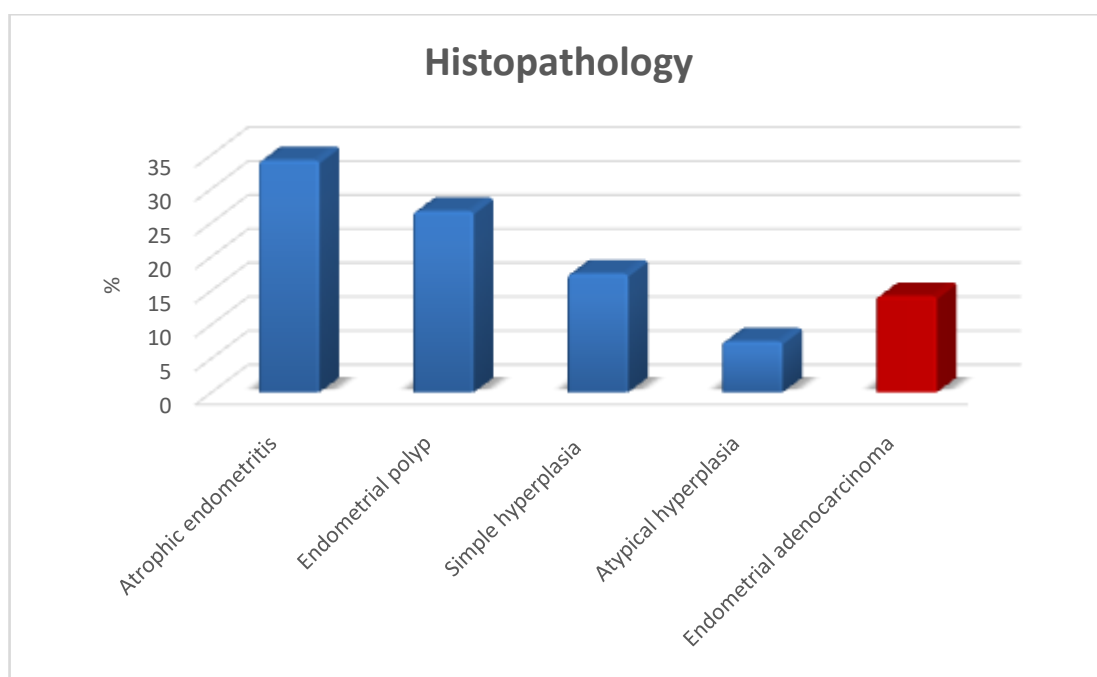
This study showed that the duration of menopause among the studied cases ranged from 1 to 22 years with mean 7.21 years. Regarding duration of bleeding it ranged from 2 to 90 days with mean 29.76 days table 2.

This study showed that the ET of the studied cases ranged from 1 to 20 mm with mean 9.65 ymm. Also 48.3% of the cases had endometrial thickness more than 10 mm, 34.2% had less than 5 mm and 17.5% had from 5 to 10 mmfigure 1.



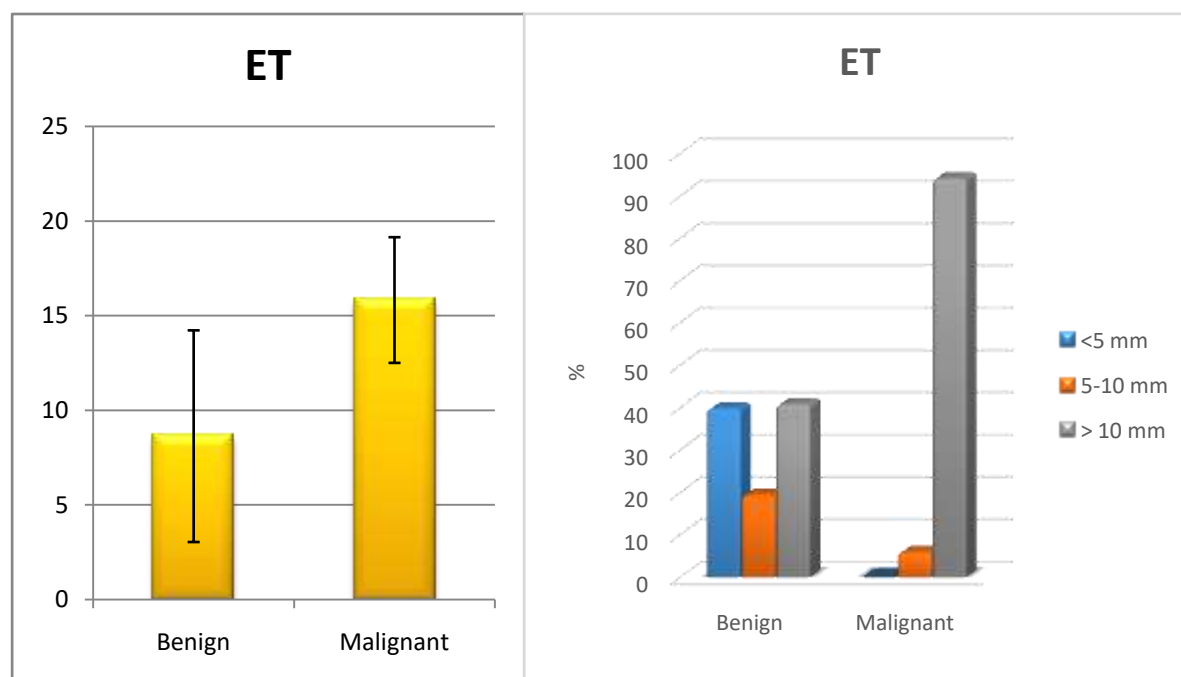
**Figure (1): Endometrial thickness among the studied cases.**

This study showed that 34.2% of the studied cases had atrophic endometritis, 26.7% had endometrial polyp, 17.5% had simple hyperplasia, 7.5% had atypical hyperplasia and finally 14.2% had endometrial adenocarcinoma Figure 2.



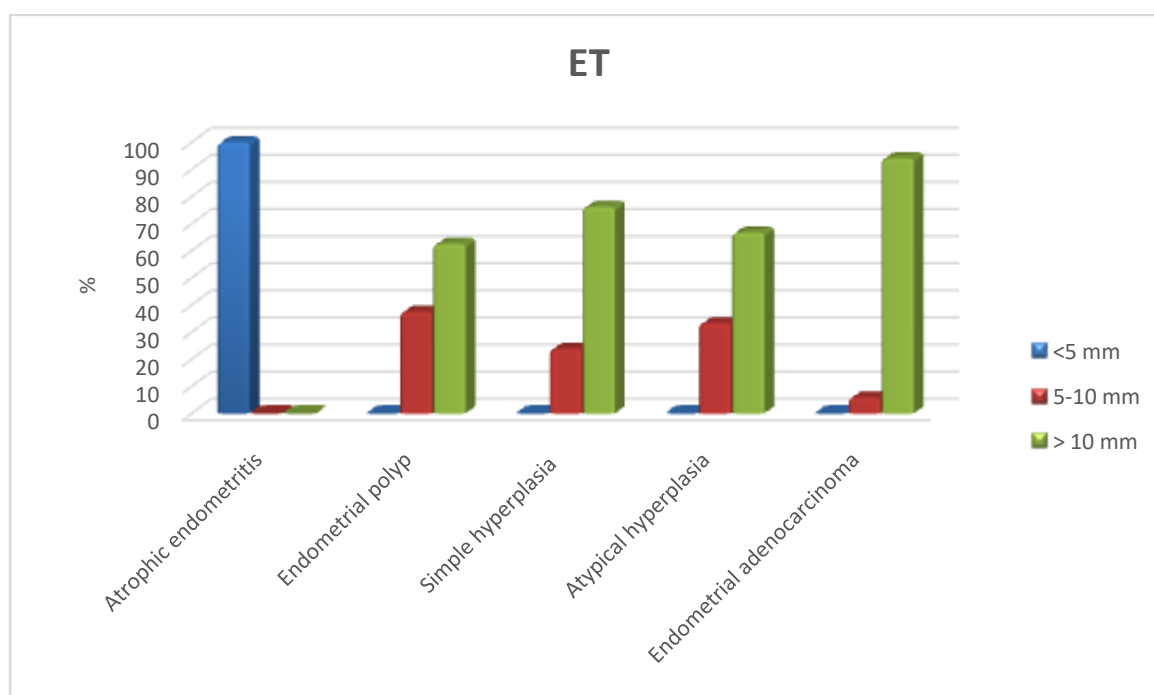
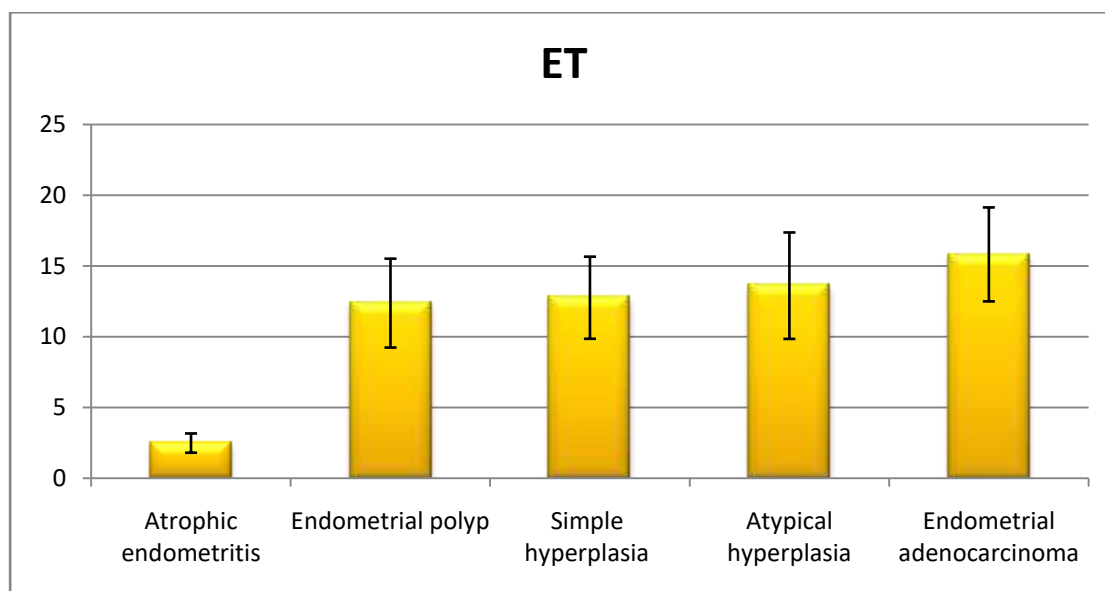
**Figure (2):** Histo-pathological findings among the studied cases.

There was a highly statistical significance increase in mean endometrial thickness among malignant cases compared to benign cases. Also there was a highly statistical significance increase in frequency of cases had ET more than 10 mm in malignant cases compared to benign cases Figure 3.



**Figure (3):** Endometrial thickness in benign & malignant cases.

There was a highly statistical significance increase in mean endometrial thickness among endometrial adenocarcinoma cases compared to other cases and a highly statistical significance decrease in mean endometrial thickness among atrophic endometrities cases compared to other cases. Also there was a highly statistical significance increase in frequency of cases had ET more than 10 mm in endometrial adenocarcinoma compared to other cases and increase in frequency of cases had ET less than 5mm among atrophic endometrities compared to other casesFigure 4.



**Figure (4):** Relation between histo-pathological diagnosis and endometrial thickness among the studied cases.

**Table (7): Correlation between endometrial thickness and demographic and history of the studied cases:**

Variable	ET (n=120)	
	r	P
Age (years)	0.01	0.99 NS
BMI (Kg/m <sup>2</sup> )	0.15	0.11 NS
Parity	-0.03	0.78 NS
Duration of menopause	-0.07	0.48 NS
Duration of bleeding	-0.11	0.24 NS

r: Spearman's correlation coefficient

NS: Non significant (P>0.05)

There was no correlation between endometrial thickness and any of the studied parameters among the cases table 7.

#### IV. DISCUSSION

Across sectional study where 120 females patients with postmenopausal bleeding were assigned to TVS measurement of endometrial thickness, endometrial sampling and histopathological examination. It was found that mean age ( $\mu$ ) =  $57.7 \pm 6.67$ , the mean BMI ( $\mu$ ) =  $32.7 \pm 3.11$ , the mean parity ( $\mu$ ) =  $3.7 \pm 1.2$  and the mean ET ( $\mu$ ) =  $9.65 \pm 5.88$ .

Endometrial biopsy was received from all cases (n=120) which 17 of them had endometrial cancer with mean endometrial thickness 15.82mm. 41 of them had atrophic endometrial with mean endometrial thickness 2.49 mm.

32 cases of them had endometrial polyp with mean thickness 15.38mm and 30 cases of them. Diagnosed as endometrial hyperplasia. With mean thickness 12.76mm.

This in a line with the study of **Kim et al.** <sup>[7]</sup> in which the predominant of endometrial growth was high in patients who had endometrial thickness > 9.5mm.

Several studies however, have been done to detect the value of vaginal ultrasonography to evaluate endometrial thickness as a parameter for excluding endometrial abnormalities. With regard to endometrial abnormality if a 5mm cut-off limit was used for endometrial thickness, a positive predictive value of 87.3% and a specificity of 96% and a sensitivity of 100% for identifying endometrial abnormality were obtained. One of the

earliest was the study done by **Osmer et al.**<sup>[8]</sup> who studied 155 normal postmenopausal women using 4mm endometrial thickness cut-off limit by vaginal ultrasound and reported a sensitivity of 81%.

Moreover, in a study conducted by **Granberg et al.**<sup>[9]</sup> to determine the value of endovaginal ultrasonography in women presenting with postmenopausal bleeding by comparing it to classical diagnostic curettage, 205 patients were considered. Patients were scanned endovaginally the day before operation by a transducer of 7MHz frequency. Then, curettage was performed by an experienced gynecologist. No endometrial abnormality was found if the endometrium was less than 5mm thickness.

**Goldstein et al.**<sup>[10]</sup> suggested 6mm as a cut-off point, **Granberg et al.**<sup>[9]</sup> found it reasonable to have a cut-off limit for normal postmenopausal endometrium at 5mm including both layers. **Tongsong et al.**<sup>[11]</sup> found that an endometrial thickness of greater than 7mm in the anteroposterior dimension, usually indicated hyperplasia or carcinoma in the postmenopausal patient. **Guner et al.**<sup>[12]</sup> suggested taking a 4mm cut-off point for excluding endometrial abnormality in postmenopausal women, and a cut-off point of 8mm in premenopausal women.

**Malinova and Pehlivanov**<sup>[13]</sup> studied that women with postmenopausal bleeding by transvaginal sonography. They compared these results together with results of 30 control women in relation to the histopathological results of endometrial biopsy. They found no cases of endometrial cancer when the endometrial thickness is <6mm. They conducted that a cut-off value of 6mm has a sensitivity of 100% and that there is no need to perform curettage if the endometrium <6mm.

As regard studying of endometrial thickness for benign lesion in this study is 1-18mm, and the endometrial thickness for malignant lesion is 10-20mm.

The mean thickness of atrophic endometrium, endometrial polyp, hyperplastic endometrium, and endometrial cancer were 2.5mm 12.3 mm. 13.6mm and 18.8 mm respectively and there was statistical significant difference between endometrial thickness and different histopathological findings.

**Erkan et al.**<sup>[14]</sup> found median endometrial thickness of 5mm, 8.5mm 6mm for benign, hyperplastic and carcinomatous endometrium respectively and postulated 3mm point. This was revised later by **Bender**<sup>[15]</sup> studied 242 patients with abnormal uterine bleeding (age range 45-86 years). They found the mean endometrial thickness for benign, hyperplastic and malignant endometrium to be 3.38mm, 6.09mm and 8.96mm; respectively.

It has been shown that 70% of curettages performed for postmenopausal bleeding could have been avoided if an endometrium less than 5mm had been demonstrated vaginosonographically<sup>[16]</sup>.

After histopathological examination of endometrium the majority of cases showed atrophic endometrial changes 34.1%.

Similar to this study the work of Pragati et al 2014 it was watched that atrophic endometrium was additionally most well-known histological finding (32%). Also to this review in the work of Dawood et al in 2010 in which the commonest reason for PMB was atrophic endometritis 33 (21.2%). General rate of different genital tract malignancies was 25 (16.0%).



In the work of **Kim et al.** <sup>[17]</sup> in which the endometrial histopathologic discoveries of 174 ladies, atrophic endometrium was additionally the most widely recognized finding (30.5%).

In the work of Singh et al in 2016 dominant part (38.33 %) of patients had atrophic endometrium.

Against this was the work of Keirse in 1999 in which atrophic endometrium was the second most regular finding. It was analyzed in 11-9% of the cases.

In this study the second regular cause of postmenopausal bleeding was endometrial polyp 26.7% of cases this was in a line with the work of **Keirse** <sup>[18]</sup> in which endometrial polyp was likewise the second normal finding and was discovered in 21-7 % of cases.

Against this was the work of Singh et al in 2016 in which endometrial polyp was (10 %) of patients and the work of Cho et al in 2013 endometrial polyp was 9.2 %.

In this study the third regular cause of postmenopausal bleeding after atrophic endometrium and endometrial polyp was endometrial hyperplasia which represented 25% of cases then endometrial cancer which represented 14.2% of cases.

Similar to this study the work of Singh et al. 2016 in which endometrial hyperplasia was distinguished in 14 (23.33 %) out of which 11 had basic hyperplasia while 3 had atypical hyperplasia. Endometrial malignancy was identified in 8 (13.33 %) patients.

In the work of **Kim et al** <sup>[17]</sup> endometrial cancer was affirmed in 28 cases (16.1%), and endometrial hyperplasia was analyzed in 17 cases (9.8%).

Against to this review the work of Pragati et al 2014 in which Endometrial adenocarcinoma was found in 3.64% of cases

In this study the range of endometrial thickness was 1mm to 20mm with mean 10.4mm this was coincide of **Famuyide et al.** <sup>[19]</sup>. Where the scope of endometrial estimations was 4.2 to 28mm (mean = 10.0mm). Additionally in the work of **Turnbull et al.** <sup>[20]</sup> where over a 52-month time frame, 4148 ladies were researched for postmenopausal vaginal bleeding. 588 (14.2%) ladies were found to have endometrial thickness estimations of equivalent to or more noteworthy than 10 mm on transvaginal ultrasonography.

In this study there was a highly statistical significance increase in frequency of E.C cases had ET more than 10mm similar to this review is the study of **Ilan Bruchim et al.** <sup>[21]</sup> in which the mean endometrial thickness was significantly lower in absence of endometrial carcinoma ( $9.6 \pm 4.3\text{mm}$ ) than in its presence ( $13.5 \pm 7.7\text{mm}$ ).

## V. CONCLUSIONS

TVS evaluation of endometrial thickness is not sensitive enough to detect cancer of endometrium and therefore couldn't replace histological evaluation of the endometrial tissue in women with postmenopausal bleeding.

Further studies will need transvaginalsonographic morphology and echogenicity of endometrium in addition to endometrial thickness measurement to detect endometrial lesions.

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