

Clinical Presentations and Transvaginal Sonographic Findings Among Non-Pregnant Women Presenting with Abnormal Per Vaginal Bleeding At the Muhimbili National Hospital

Neema Byera Ndibalema¹, Zuhura Nkrumbhi², Lilian Salingwa³,
Jaqueline Gabone⁴

^{1,2,3}Department of Radiology and Imaging, Muhimbili University of Health and Allied Sciences, MUHAS. P O Box 65001, Dar-es -Salaam Tanzania.

⁴Department of radiology . Agakhan Hospital Dar-es –salaam

Abstract

Introduction: Gynecological structural disorders commonly present with abnormal vaginal bleeding, which is a common cause of morbidity and mortality. There are so many other different causes of AVB and the clinical appearance may differ depending on the underlying etiology. Hence-forth determining if there is an association between clinical presentation and ultrasound imaging results might provide useful information for narrowing down the differential diagnosis and triaging patients to expedite treatment especially in our setting were studies are limited.

Aim: The study was done to determine the association of the trans-vaginal sonographic findings and clinical presentations in non-pregnant women with abnormal per vaginal bleeding at Muhimbili national hospital

Material and Methods: This was a prospective hospital based descriptive cross sectional study conducted at the Muhimbili radiology department from December 2021 to April 2022. 146 non-pregnant women who met the inclusion criteria were enrolled . A structured questionnaire was used to extract demographic and clinical information. Data analysis was done using SPSS version 23 and summarized using tables and figures.

Descriptive statistics was used to summarize demographic and clinical characteristics. Univariate and multivariate logic regression was used to test the association between clinical characteristics and the trans-vaginal sonographic findings. The observed differences were considered significant at p value < 0.05.

Results: Majority of the study subjects had a normal menstrual cycle of 28-35days and presented with heavy menstrual bleeding .Sonographic abnormalities were found in 72.6% of study subjects. The most common abnormality was uterine lesions. On multivariate analysis on association of clinical presentations and sonographic findings the study showed that the odds of having cervical lesions is 32 times more in patients having a menstrual cycle of <21 (OR=32.493; 95% CI, 1.735-608.583;P=0.02).while those with a normal menstrual cycle(28-35) have 7 times the odds of having sonographic finding of uterine lesions or ovarian lesion (OR=6.759; 95% CI, 1.871-24.418, p=0.004)and(OR=6.746; 95% CI, 1.681-27.076; p=0.007)

Conclusion: Uterine and ovarian lesions are more likely to be seen in patients with a menstrual cycle (28-35days) while cervical lesions are more likely to occur in patients with a short menstrual cycle. (< 21days)

Recommendations: Patients with a normal menstrual cycle of 28-35days presenting with abnormal vaginal bleeding should be investigated thoroughly as majority have been noted to have uterine and ovarian lesions. Transvaginal ultrasound should be considered as an investigation of choice in patients presenting with AVB since it has detected majority of gynecological structural abnormalities in this study.

Keywords: Abnormal per vaginal bleeding, , cervical lesions, uterine lesions, ovarian lesion and Transvaginal ultrasound.

INTRODUCTION

Abnormal per vaginal bleeding is a common cause of morbidity among women that has a negative impact on the quality of life.(1-5) it is a common complaint that leads to patients being referred for additional treatment from tertiary health centers (6,7). During their menstrual years, almost one in every five women experiences some type of abnormal vaginal bleeding (6).

The prevalence of abnormal per vaginal bleeding in postmenopausal women ranges from 4 to 11%,the incidence of post-menopausal bleeding decreases with time from approximately 400/1000 women/year immediately after menopause to 42/100 women per year 3years after menopause(8).

The etiology of AVB in non- pregnant women can be grouped into structural and functional causes(9). The functional causes include anovulatory cycles which are most common in adolescents, hormonal contraceptive use, endometrial disorders such as hypothyroidism, anticoagulant therapy such as warfarin and bleeding disorders e.g. thrombocytopenia(10).

The structural causes of AVB may be grouped according to their anatomical location including uterine lesions such as uterine fibroids, Endometrial lesions e.g. endometrial polyps, cervical lesions such as cervical cancer or cervical polyp, ovarian lesions example ovarian cysts and lastly vaginal lesions example vaginal polyp and vaginal atrophy in postmenopausal women (10).

The clinical presentation in abnormal per vaginal bleeding among non-pregnant women is variable ranging from heavy bleeding prolonged bleeding, excessive pain during menstrual bleeding, inter-menstrual bleeding, post coital bleeding as well as contact bleeding (11–13)

Heavy menstrual bleeding is the most common presentation of abnormal vaginal bleeding(10,14,15).Dysmenorrhea is a common finding in more than half of the women presenting with abnormal vaginal bleeding while Inter-menstrual bleeding causes include ovulation, sexual transmitted diseases, endometrial or cervical polyps, use of progesterone only pills, endometrial hyperplasia or malignancy and caesarean scar defect(10).Post-coital bleeding causes include STI's, cervical, ectropian or polyps, atrophic vaginitis, cervical cancer, vaginal cancer and trauma (10,16).

A link between clinical presentation and sonographic findings among women with abnormal per vaginal bleeding has been observed in various studies e.g. Africa Ethiopia(17) and Asia Iran(18) in these studies significant associations between clinical presentations and sonographic findings were seen

According to studies conducted in different parts of the world example Kenya(19), India(20) and Europe Netherlands(19) uterine lesions that is fibroids are the most common sonographic finding in women with abnormal per vaginal bleeding (21).

Clinical presentation of abnormal per vaginal bleeding can act as an indicator of an underlying cause and can be used as a guide in determining the differential diagnosis of AVB, however there are many different

causes(23).

In Tanzania the studies showing the association of clinical presentations in AVB and sonographic findings are limited

This makes it is critical to identify the most common AVB presentations and structural causes particularly in our own environment, and determine the association of these presentation and sonographic findings in order to aid triage and care of patients with AVB.

METHODOLOGY

Study design

This was a prospective cross-sectional descriptive hospital-based study conducted from December 2021 to April 2022.

Study setting

Study was done at the Muhimbili National Hospital Radiology department Muhimbili National Hospital (MNH). Were 150 gynaecological ultrasounds are performed in a month

Study population

The study included non- pregnant females who presented with abnormal vaginal bleeding bleeding referred to the radiology department for pelvic ultrasound at the Muhimbili national hospital.

Inclusion criteria:

Eligible non-pregnant women who presented with abnormal vaginal bleeding and were referred to the radiology department for ultrasound imaging at Muhimbili national hospitals from Patients with normal menstrual cycle (28-35) with complaints such as dysmenorrhea and heavy bleeding were also included this study was performed from December 2021 to April 2022.

Exclusion criteria:

Study did not involve women who presented with features of acute pelvic inflammatory disease as benign and malignant lesions were the target for this particular study

Any patient presenting with clinical symptoms related to acute pelvic inflammatory disease was excluded

Sample size determination

The sample size formula was calculated for a finite population size as was previously described (34), using the following:

$$n = \frac{N(Z^2)P(1 - P)}{(d^2)(N - 1) + (Z^2)P(1 - P)}$$

Where n=estimated sample size,N= population size=400patients Z= SND at the chosen significance level =1.96P= Reported Prevalence of AVB = 18.23% according to a previous report (35)d= margin of error= 5% **Therefore, 146 patients were recruited in this study**

Sampling technique

Convenient sampling was utilized due to time allocated and the availability of patients. Patients who attended the radiology department for ultrasound imaging and fulfilled the inclusion criteria for this study were approached and requested to participate in the study.

Data collection

Consent and data collection was done at the radiological department prior to prospectively by data collection tool (structured questionnaire).informed consent was obtained from the Whereby the demographic characteristics' and the clinical presentations was documented in different sections of the

structured questionnaire. While ultrasound was performed by resident radiologists and supervised by the radiologist on duty in the ultrasound room

Any inconclusive finding was counter checked by another radiologist

The sonographic findings were documented in the questionnaire during and immediately after transvaginal ultrasound was is done.

Data analysis

Questionnaire was checked for completeness, then data was transferred and recorded in an excel (SPSS) version 23 with consistence checks the obtained data was cleaned. Analysis was done using the same software; summary statistics was determined as frequency Descriptive analysis was done using frequency and proportional for categorical variables. Proportions were computed from the total study population. Logic regression was used to determine the association computed to compare the association of transvaginal sonographic findings as to the dependent variable and clinical characteristics of subjects as independent (predictor) variables. Variables were eliminated one by one at a time from the full model using the p-value of the likelihood ratio tests with a cut-off point of 0.5 whereby a variable with the largest p-value was removed first. The variables retained in the final multinomial logistic regression model including age group, length of the menstrual cycle, amount of menstrual blood, age at menarche, and presence of co-morbidities .

Ethical consideration

Ethical clearance was obtained from the Institutional Review Board (IRB) of Muhimbili University of Health Allied Sciences (MUHAS). Permission to conduct the study at Muhimbili Radiology Department was obtained from the Authorities. Patients’ information was kept confidential and names were not used. Research identification numbers were used for all participants in the data collection tool.

RESULTS

A total of 146 subjects who fulfilled the inclusion criteria were included in this study.

1. Demographic characteristics of study subjects

Majority of respondents were ≤ 40 years old (60.3%) and aged between 31-40 (32. 9%).with the minority in the 51-60 age group category (5.5%) as shown in table 1

Table 1: Demographic characteristics of non- pregnant women presenting with AVB at MNH (N=146).

Variable	Categories	Frequency	Percent (%)
Age	<=30	40	27.4
	31-40	48	32.9
	41-50	38	26.0
	51-60	8	5.5
	>60	12	8.2

2. Clinical characteristics of non –pregnant women with AVB at MNH.

Most of the study subjects were pre-menopausal women (87.7%). Majority of subjects had no history of abortion or contraceptive use. About 25% of study subjects had an underlying condition, hypertension

being the most common underlying condition in 17.8% of subjects. Majority of subjects had normal length menstrual cycle (21-35 days) and 65.6% reported heavy menstrual bleeding as shown in (Table 2).

Table 2: Clinical characteristics of non –pregnant women with AVB at MNH.

Variable	Categories	Frequency	Percent (%)
Age at menarche	9-12	26	17.8
	13-15	95	65.1
	>15	25	17.1
Menopause status	Yes	18	12.3
	No	128	87.7
Age at menopause	<=40 years	1	5.6
	41-50 years	13	72.2
	51-60 years	4	22.2
Parity	Null parous	58	39.7
	Para1	34	23.3
	Multipara	54	37.0
History of abortion	Yes	61	41.8
	No	85	58.2
Length of menstrual cycle	<21 days	24	18.8
	21-35 days	72	56.3
	>35 days	30	23.4
	>6 months	2	1.6
Amount of menstrual blood	Heavy bleeding	84	65.6
	Normal bleeding	37	28.9
	Little bleeding	7	5.5
Duration of menstrual bleeding	>7 days	45	35.2
	2-7 days	78	60.9
Other per vaginal bleeding disorders	<2 days	5	3.9
	Contact bleeding	7	4.8
	Inter-menstrual bleeding	23	15.8
	Post-menopausal bleeding	19	13.0
History of dysmenorrhea	None	97	66.4
	Yes	88	68.2
History of contraceptive use	No	41	31.8
	No	97	74.0
	Oral contraceptive	8	6.1
	IUCD	2	1.5
	Inj depo-povera	16	12.2
Underlying disease	Implanon	8	6.1
	DM	7	4.8
	HTN	26	17.8

Others**	3	2.1
None	110	75.3

**Others include SCD and hypo/hyperthyroidism

3 Transvaginal sonographic findings of non-pregnant women presenting with AVB at MNH

Majority of the study subjects had gynecological structural abnormalities (72.6%). The most common location of the abnormalities was the myometrium (38.1%) **Table 3.**

Table 3: Transvaginal sonographic findings among non- pregnant women presenting with AVB at MNH.

Variable	Categories	Frequency	Percent (%)
Abnormalities seen	Yes	106	72.6
	No	40	27.4
Anatomical location of abnormalities	Myometrium	40	38.1
	Ovaries	26	24.8
	Cervix	18	17.1
	Endometrium	11	10.5
	Multiple sites	5	4.8
	others	5	4.8

4 Association between transvaginal sonographic findings and clinical characteristics in non-pregnant women presenting with abnormal vaginal bleeding at Muhinbili national hospitals

Univariate analysis showed statistically significant association between trans-vaginal sonographic findings and age group ($p < 0.0001$), presence of menstrual abnormalities ($p < 0.0001$), menopause status ($p < 0.0001$), length of menstrual cycle ($p = 0.003$), amount of menstrual blood ($p = 0.012$) as well as having underlying conditions ($p = 0.005$) as shown in table 4

Multivariate analysis showed different associations between the 5 categories of the dependent variable representing transvaginal sonographic findings: cervical lesion, ovarian lesion, uterine lesion, as demonstrated in (Table 5a, 5b , 5c)

Having a menstrual cycle of < 21 days had 32 times more likely hood of positive findings of cervical lesions compared to having a menstrual cycle of > 35 days (OR=32.493; 95% CI, 1.735-608.583; $P = 0.02$). A menstrual cycle of 21-35 days showed a positive association with 7 times more likely hood to have a sonographic finding of uterine lesion or ovarian lesion compared to a menstrual cycle of > 35 days (OR=6.759; 95% CI, 1.871-24.418, $p = 0.004$) and (OR=6.746; 95% CI, 1.681-27.076; $p = 0.007$) respectively.

On the other hand, attaining menarche at the age of 13-15 years associated negatively with a positive finding of cervical lesion compared to attaining menarche at > 15 years (OR=0.067; 95%CI, 0.008-0.539; $p = 0.011$). Also, there were significant negative associations between age group and sonographic findings of uterine lesions for age groups < 51 years compared to ≥ 51 years.

Table 4: Univariate analysis of the association between sonographic findings and clinical characteristics of non –pregnant women presenting with AVB at MNH

Variable	Categories	Sonographic findings					X ² (df)	p-value
		Cervical lesion N (%)	Ovarian lesion N (%)	Others N (%)	Uterine lesion N (%)	No lesion N (%)		
Age group	≤30 years	0	15(57.7)	2(18.2)	8(15.7)	16(38.1)	71.241(12)	<0.0001
	31-40 years	0	7(26.9)	7(63.6)	16(31.4)	17(40.5)		
	41-50 years	6(37.5)	3(11.5)	2(18.2)	21(41.2)	7(16.7)		
	≥51 years	10(62.5)	1(3.8)	0	6(11.8)	2(4.8)		
Menstrual abnormalities	Contact PV bleeding	5(31.3)	2(7.7)	0	0	0	73.043(12)	<0.0001
	Intermenstrual bleeding	1(6.3)	8(30.8)	1(9.1)	8(15.7)	5(11.9)		
	Post-menopausal bleeding	9(56.3)	1(3.8)	0	6(11.8)	3(7.1)		
Menopause status	None	1(6.3)	15(57.7)	10(90.9)	37(72.5)	34(81.0)	33.179(4)	<0.0001
	Yes	9(56.3)	1(3.8)	0	5(9.8)	3(7.1)		
	No	7(43.8)	25(96.2)	11(100)	46(90.2)	39(92.9)		
Duration of menstrual bleeding	≤7 days	5(71.4)	20(80)	5(45.5)	25(54.3)	28(71.8)	7.516(4)	0.111
	>7 days	2(28.6)	5(20)	6(54.5)	21(45.7)	11(28.2)		
Length of menstrual cycle	<21 days	3(42.9)	3(12.0)	4(36.4)	8(17.4)	6(15.4)	23.653(8)	0.003
	21-35 days	4(57.1)	17(68.0)	5(45.5)	32(69.6)	14(35.9)		
	>35 days	0	5(20.0)	2(18.2)	13(46)	19(48.7)		
Co-morbidities	Diabetes mellitus	1(14.3)	1(14.3)	2(28.6)	2(28.6)	1(14.3)	28.015	0.006
	Hypertension	8(30.8)	0	2(7.7)	12(46.2)	4(15.4)		
	Others**	0	0	0	2(66.7)	1(33.3)		
	None	7(6.4)	25(22.7)	7(6.4)	35(31.8)	36(32.7)		

Amount of menstrual bleeding	Heavy bleeding	3(50.0)	13(52.0)	9(81.8)	38(82.6)	21(52.5)	12.922(4)	0.012
	Little or normal bleeding	3(50.0)	12(48.0)	2(18.2)	8(17.4)	19(47.5)		
History of contraceptive use	Yes	5(55.6)	6(24)	2(18.2)	9(19.6)	12(30)	5.817(4)	0.213
	No	4(44.4)	19(76)	9(81.1)	37(80.4)	28(70)		
History of abortion	Yes	6(37.5)	9(34.6)	6(54.5)	26(51.0)	14(35.3)	4.413(4)	0.353
	No	10(62.5)	17(65.4)	5(45.5)	25(49.0)	28(66.7)		
History of dysmenorrhea	Yes	5(71.4)	14(56.0)	8(72.7)	36(78.3)	25(62.5)	4.601(4)	0.331
	No	2(28.6)	11(44.0)	3(27.3)	10(21.7)	15(37.5)		
Age at menarche	9-12 years	2(12.5)	7(26.9)	1(9.1)	9(17.6)	7(16.7)	7.960(8)	0.437
	13-15 years	9(56.3)	18(69.2)	7(63.6)	32(62.7)	29(69.0)		
	>15 years	5(31.3)	1(3.8)	3(27.3)	10(19.6)	6(14.3)		

**Others include SCD and hypo/hyperthyroidism

Table 5 a: Adjusted odds ratios of having a positive sonographic finding for cervical lesion, compared to no lesion/abnormality among non-pregnant women with abnormal PV bleeding at MNH

Variable(reference)	Category	OR	95% CI		p-value	
			Lower bound	Upper bound		
Cervical lesion vs. no lesion (reference level: no lesion)	Age group (≥ 51 years)	≤30 years	1.99x10 ⁻⁶	3.342x10 ⁻⁵³	1.185x10 ⁺⁴¹	0.811
		31-40 years	2.92x10 ⁻⁶	4.917x10 ⁻⁵³	1.744x10 ⁺⁴¹	0.817
		41-50 years	4.02x10 ⁻⁵	6.86x10 ⁻⁵²	2.355x10 ⁺⁴²	0.854
	Length of the menstrual cycle (>35 days)	<21 days	32.493	1.735	608.583	0.020
		21-35 days	12.677	0.901	178.448	0.060
		Amount of menstrual blood (little or normal)	Heavy bleeding	0.445	0.062	3.187
	9-12	0.133	0.006	3.179	0.213	

Age at menarche (> 15 years)	13-15 years	0.067	0.008	0.539	0.011
	Diabetes	.294	.001	88.6	0.674
Co-morbidities (None)	hypertension	.932	.092	9.43	0.952
	Others**	1.260	1.13×10^{-11}	$1.40 \times 10^{+12}$	0.986
Amount of menstrual blood (little or normal)	Heavy bleeding	0.931	0.286	3.036	0.906
	Age at menarche (> 15 years)	9-12	4.084	0.397	42.014
Co-morbidities (None)	13-15 years	2.140	0.264	17.352	0.476
	Diabetes	.925	0.008	106.240	0.974
	hypertension	.462	0.038	5.689	0.547
Co-morbidities (None)	Others**	.118	4.28×10^{-8}	$3.22 \times 10^{+5}$	0.777
	Diabetes	39.94	0.749	2129.22	0.069
	hypertension	2.04	0.216	19.21	0.535
Co-morbidities (None)	Others**	5.19	1.23×10^{-8}	$2.19 \times 10^{+7}$	0.871

**Others include SCD and hypo/hyperthyroidism.

Table 5 b: Adjusted odds ratios of having a positive sonographic finding for uterine lesion, compared to no lesion/abnormality among non-pregnant women with abnormal PV bleeding at MNH

Variable (reference)	Category	OR	95% CI		p-value	
			Lower bound	Upper bound		
Uterine lesion vs. no lesion (reference level: no lesion)	Age group (≥ 51 years)	≤ 30 years	5.68×10^{-9}	1.28×10^{-9}	2.52×10^{-8}	<0.0001
		31-40 years	6.36×10^{-9}	1.63×10^{-9}	2.48×10^{-8}	<0.0001
		41-50 years	2.36×10^{-8}	2.36×10^{-8}	2.36×10^{-8}	<0.0001
Length of the menstrual cycle (>35 days)		<21 days	2.847	0.513	15.789	0.231
		21-35 days	6.759	1.871	24.418	0.004
Amount of menstrual blood (little or normal)		Heavy bleeding	2.725	0.830	8.947	0.098

Age at menarche (> 15 years)	9-12	2.103	0.296	14.920	0.457
	13-15 years	1.096	0.206	5.833	0.915
Co-morbidities (None)	Diabetes	0.730	0.005	97.407	0.900
	hypertension	1.662	0.306	9.030	0.557
	Others**	22.10	0.001	3.27x10 ⁺⁵	0.527

**Others include SCD and hypo/hyperthyroidism

Table 5 c: Adjusted odds ratios of having a positive sonographic finding of ovarian lesion, compared to no lesion/abnormality among non-pregnant women with abnormal PV bleeding at MNH

	Variable(reference)	Category	OR	95% CI		p-value
				Lower bound	Upper bound	
Ovarian lesion vs. no lesion (reference level: no lesion)	Age group (≥ 51 years)	≤30 years	1.087	0.205	5.760	0.922
		31-40 years	0.308	0.054	1.745	0.183
		41-50 years	0.631	0.631	0.631	1.000
Length of the menstrual cycle (>35 days)		<21 days	2.859	0.463	17.650	0.258
		21-35 days	6.746	1.681	27.076	0.007
Amount of menstrual blood (little or normal)		Heavy bleeding	0.931	0.286	3.036	0.906
Age at menarche (> 15 years)		9-12	4.084	0.397	42.014	0.237
		13-15 years	2.140	0.264	17.352	0.476
Co-morbidities (None)		Diabetes	.925	0.008	106.240	0.974
		hypertension	.462	0.038	5.689	0.547
		Others**	.118	4.28X10 ⁻⁸	3.22x10 ⁺⁵	0.777

**Others include SCD and hypo/hyperthyroidism

Table 5 d: Adjusted odds ratios of having a positive sonographic finding for Others compared to no lesion/abnormality among non-pregnant women with abnormal PV bleeding at MNH

Variable(reference)	Category	OR	95% CI
---------------------	----------	----	--------

					Lower bound	Upper bound	p-value
Others vs. no lesion (reference level: no lesion)	Age group (≥ 51 years)	≤30 years	0.461	0.041	5.166	0.530	
		31-40 years	1.007	0.113	8.937	0.995	
		41-50 years	0.442	0.442	0.442	1.000	
	Length of the menstrual cycle (>35 days)	<21 days	5.583	0.603	51.687	0.130	
		21-35 days	2.281	0.316	16.479	0.414	
	Amount of menstrual blood (little or normal)	Heavy bleeding	2.799	0.457	17.154	0.266	
		Age at menarche (> 15 years)	9-12	0.399	0.028	5.776	0.500
	Co-morbidities (None)	13-15 years	0.515	0.069	3.840	0.518	
		Diabetes	39.94	0.749	2129.22	0.069	
		hypertension	2.04	0.216	19.21	0.535	
	Others**	5.19	1.23X10 ⁻⁸	2.19X10 ⁺⁷	0.871		

**Others include SCD and hypo/hyperthyroidism

DISCUSSION

Majority of respondents were ≤ 40 years old, with a most common age group that was between 31-40, These findings are similar to previous studies done in West Africa Cameroon where majority of the study subjects were between 31-50years of age(24). Not only that but also another study done in Ethiopia had similar findings were one fifth of the study subjects mostly ranged between 20-25 years of Age (17) .A study done in Kenya also showed that most of the study subjects were less than 40 years of age .(25)

In a study done in Asia Iran the majority of the study subjects ranged from age 20-40 (11) While in a study done in India the study subjects presenting with AVB were mostly below 40 years of age(26). However these findings are contrary to a study done in Europe Italy by Belcaro et al that demonstrated that the common age group was above 45 years of age (27)

Also another study done in India by Amruta Gadge et al where the study subjects were above 40 years of age(28). As demonstrated above there are many similarities seen and some differences noted in the previous studies this may be attributed to the study type, geographic distribution and social economic status of the study population.

In regards to the amount of bleeding ,heavy menstrual bleeding was seen in more than half of the study subjects this was a similar finding to a previous study done in East Africa Kenya were also more than half of the study subjects presented with heavy menstrual bleeding(19) In a study done in West Africa Cameroon the most common presentation was also heavy menstrual bleeding(29) Not only that also in a

study done in India Asia , more than half of the study subjects also presented with heavy menstrual bleeding (29).

Other parts of Asia such as Iran ,also demonstrates similar findings mostly within the premenopausal age group ,so despite differences in geographic locations, or study type the findings are similar. This might be partly attributed to the underlying cause that mostly present with heavy menstrual bleeding that is uterine lesions specifically fibroids(15,30,31).

More than three quarters of the study subjects had a normal menstrual cycle as demonstrated in Table 4. This finding is similar to a study done in Cameroon by K Marie N et al were almost 80% of the study subjects had a normal menstrual cycle (24) of irregular menstrual cycle is generally less than 20% in prevalence as noted in a WHO study by Hernandez I et al (32)

Furthermore in terms of duration of menses, Two thirds of the study subjects presented with a normal duration of menstruation. This is in agreement with a study done in Asia Iran (9) However in a study done in Kenya by G Shichenje M et al majority of the study subjects presented with prolonged menses(25) this is also similar to a study done in Ethiopia were prolonged menses was also a common finding (17) (43), However another study done in Cameroon demonstrated that two thirds of the study subjects presented with a duration of less than 2days(24) these differences could be attributed to the study population,study design and geographic locations.

Other clinical presentations of abnormal vaginal bleeding discussed in this study include contact bleeding, intermenstrual bleeding and postmenopausal bleeding were by intermenstrual bleeding was the most common finding and accounted for a proportion of 15.8%.This is similar to previous studies done in West Africa by K Marie et al where one fifth of the subjects presented with intermenstrual bleeding(24) Also in another study done in East Africa Kenya by G Shichenje M et al intermenstrual bleeding was also a common finding seen in one fifth of the study subjects(25) this is also similar to a study done in India by S.Kumar (34). This could be this could be explained by the fact that incidence of intermenstrual bleeding was almost 25% in a prospective cohort study done in peri menopausal women (35)

More than two thirds of subjects had no underlying condition whereby among the minority who had underlying condition hypertension was the most common accounting for a proportion of 17.8%. This was similar to studies done in North America USA and Asia India were hypertension was a common finding(22,36,37) This is contrary to a study done in other parts of Asia that is India were anemia was the most common finding. This might be attributed to the fact that laboratory investigations of anemia were done.(20)

Sonographic abnormalities were found in more than three quarters of the study subjects. This is a similar finding to a study done in Kenya were by above 90% the study subjects had a sonographic finding and only 4.8% had normal findings on ultrasound . (19) This is also similar to other two studies done in Asia India were more than two thirds of the study subjects were found to have a transvaginal sonographic finding(20,28). These similarities may be attributed to the geographic location and social demographic characteristics.

In this study the most common locations of abnormalities was the myometrium with uterine lesions (38.5%) followed by ovarian lesions that were found in 24.8% of the study subjects.This is in agreement with previous study done in Kenya by L.Akumu where fibroids were seen in two thirds of the study subjects also there was a similarity with this study in particular that the second most common sonographic findings were ovarian lesions. (33)

In another study done in East Africa, Ethiopia uterine fibroids were found in more than 50% of the study subjects (17). In a previous study done in Asia India the most common finding was uterine lesions specifically myomas that contributed to 38% of the sonographic findings (20). In Europe and America (36) were Uterine lesions specifically myomas were the most common finding, this may be attributed to similar geographic location in case of Africa and the fact that fibroids are the most common gynecological lesion in females (31).

In terms of uterine lesions, this study has shown that there is a significant association of menstrual cycle and occurrence of uterine sonographic findings this is in agreement with studies done in other parts of East Africa Ethiopia were Abnormal vaginal bleeding was associated with occurrence of uterine lesions specifically uterine fibroids (17).

However a study done in Italy concluded that there is no significant association between menstrual cycle and occurrence of uterine lesions specifically fibroids this differences could be attributed to study design and study population differences (39).

In this study no significant association was made between heavy, prolonged, short or long menstrual cycle with occurrence of uterine lesions similar to the study done in Italy (39). Contradictory results are seen a study done in Iran by Amanati et al whereby a significant association of short menstrual cycle and uterine fibroids was seen and prolonged menses and uterine fibroids was seen (18) this could be attributed to differences in study design and study population.

This study showed that the odds of having ovarian lesions are 7 times more likely to occur in people with normal menstrual cycle than those with a prolonged menstrual cycle this is contrary to a study done in Asia India showed that there is no significant association between ovarian tumours and menstrual irregularities, this could have been attributed to the presenting features of AVB of the study subjects were none of them presented with oligomenorrhea, polymenorrhea, heavy menstrual bleeding or prolonged duration of menses (40).

This study has also shown that cervical lesions are more likely to occur in patients with a short menstrual cycle this is in agreement to a study done in America that showed that there is a significant association of menstrual irregularities and occurrence of cervical cancer (41).

In this study after adjustment of odds ratio, no significant association was noted between underlying disease and occurrence of sonographic findings this is in agreement with a study done in North America by A. Sabre et al where no statistical significant association between hypertension and polyps, malignancy, endometrial lesions and adenomyosis (36) contrary to a study done in USA where a significant association was seen (42) this could be attributed to study design and population of the study.

This study showed that Cervical lesions are less likely to occur in patients with a menarche of 13-15 this is contrary to studies previous studies done in India where there was a significant association between menarche of 13-15 years and occurrence of cervical cancer (43,44) however another study in Brazil showed that cervical lesions are more likely to occur at menarche less than 12 (45) and also depends on the minimal interval between menarche and start of sexual intercourse as seen in a study done in Tanzania (46). This could be the reason as to the differences in findings with other studies.

There is significant negative associations between age group and sonographic findings of uterine lesions for age groups <51 years. This is in agreement with a previous study done in America by Sabre et al (36).

Study limitations and mitigations

Recall bias on details such as last menstrual period, Overlapping of symptoms such as AVB and abdominal pain making it hard to identify the appropriate candidates on time and type of study design is not adequate

for generalization of finding in the population.

Conclusion

Uterine and ovarian lesions are most often seen in patients with a normal menstrual cycle of 28-35 day cycle while cervical lesions are more likely to occur in patients with a short menstrual cycle (less than 21days)

Recommendations

Patients with a normal menstrual cycle presenting with AVB should be investigated thoroughly as majority have been noted to have uterine and ovarian lesions .Transvaginal ultrasound should be considered as an investigation of choice in patients presenting with AVB since it has detected majority of gynecological structural abnormalities in this study.

Acknowledgement

The ministry of health in Tanzania for providing funds to conduct this study.

REFERENCES

1. Obiageli E Nnodu, corresponding author¹ SO Giwa, ² Samuel U Eyesan ¹ and Fatima B Abdulkareem. Fine needle aspiration cytology of bone tumours- the experience from the National Orthopaedic and Lagos University Teaching Hospitals, Lagos, Nigeria. 2006.
2. Obafemi Joel Aina¹,&, Kayode Adebawale Adelusola², Ayodele Elkanah Orimolade² AA. Histopathological pattern of primary bone tumours and tumour-like lesions in Ile-Ife, Nigeria. 2018;8688:1–9.
3. Rhutso Y, Laishram RS, Sharma LDC, Debnath K. Original Article Histopathological evaluation of bone tumors in a tertiary care hospital in Manipur , India. 2013;27(2):135–9.
4. Negash BE, Admasie D, Wamisho BL, Tinsay MW. Bone tumors at Addis Ababa University , Ethiopia : Agreement between radiological and histopathological diagnoses , a -5-year analysis at Black-Lion Teaching Hospital. Int J Med Med Sci. 2009;1(4)(May):119–25.
5. Ghert M, Mwita W, Mandari FN. Primary Bone Tumors in Children and Adolescents Treated at a Referral Center in Northern Tanzania. Vol. 3, JAAOS: Global Research and Reviews. 2019. p. e045.
6. Fraser IS. Health-related quality of life and economic burden of abnormal uterine bleeding. Expert Rev Obstet Gynecol. 2009;4(2):179–89.
7. Pamela Warner, Hilary O D Critchley, Mary Ann Lumsden, Mary Campbell-Brown AD, Murray G. Referral for menstrual problems: cross sectional survey of symptoms, reasons for referral, and management. Br Med J. 2001;322(7293):1027–30.
8. Sert UY, Guler I, Nas T. Frequency of the Causes of Postmenopausal Bleeding, Results of a Tertiary Referral Center in Turkey. Gynecol Obstet Reprod Med. 2020;27(1):1–7.
9. Munro MG, Critchley HOD, Fraser IS. of causes of abnormal uterine bleeding in the reproductive years : who needs them? YMOB [Internet]. 2012;(February). Available from: <http://dx.doi.org/10.1016/j.ajog.2012.01.046>
10. Dr Anil. Investigating and managing abnormal vaginal bleeding : an overview [Internet]. 2019 [cited 2022 Jan 5]. p. 1–8. Available from: <https://bpac.org.nz/2019/bleeding.aspx>
11. Al HK et. A Population-Based Study of the Prevalence of Abnormal Uterine Bleeding and its Related

- Factors among Iranian Reproductive-Age Women: An Updated Data. *Arch Iran Med.* 2017;20(9):558–63.
12. Gray SH, Emans SJ, Gray SH, Emans SJ, Gray DH. Abnormal Vaginal Bleeding in Adolescents. *Paediatr Rev* [Internet]. 2013;28(5):175–81. Available from: <http://pedsinreview.aappublications.org>
 13. Sommer M, Phillips-howard PA, Mahon T, Zients S, Jones M, Caruso BA. Beyond menstrual hygiene : addressing vaginal bleeding throughout the life course in low and middle- income countries. *BMJ Glob Heal.* 2017;045:1–6.
 14. Daniels R V, Mccuskey C. Abnormal vaginal bleeding in the nonpregnant patient. 2003;21:751–72.
 15. Dyne PL, Miller TA. The Patient with Non – P r e g n a n c y - A s s o c i a t e d V a g i n a l B l e e d i n g. *Emerg Med Clin NA* [Internet]. 2019;37(2):153–64. Available from: <https://doi.org/10.1016/j.emc.2019.01.002>
 16. Carugno J. Clinical management of vaginal bleeding in postmenopausal women Clinical management of vaginal bleeding in postmenopausal women. *Climacteric* [Internet]. 2020;0(0):1–7. Available from: <https://doi.org/10.1080/13697137.2020.1739642>
 17. Gerema U, Kene K, Abera D, Adugna T, Nigussie M, Dereje D, et al. Abnormal uterine bleeding and associated factors among reproductive age women in Jimma town , Oromia Region , Southwest Ethiopia. *WOMEN’S Heal.* 2022;18:1–7.
 18. Mashadi-Abdollahi H, Amanati L, Sadeghi-Bazargani H, Ehdaevand. Uterine leiomyoma and its association with menstrual pattern and history of depo-medroxyprogesterone acetate injections. *Int J Gen Med.* 2011;4:535–8.
 19. L.A.Akumu. Characterisation of patients presenting with abnormal uterine bleeding with an indication for ultrasonography at Kapsabet Referral Hospital, Kenya. *Ultrasound Obstet Gynecol* 2020. 2020;56:349.
 20. DrNiharika S DNS. Role of Transvaginal Ultrasound and Endometrial Biopsy in Evaluating Abnormal Uterine Bleeding in Reproductive and Perimenopausal Age. *J Med Sci Clin Res.* 2018;06(12):880–5.
 21. Clevenger-Hoeft M, Syrop CH, Stovall DW, Van Voorhis BJ. Sonohysterography in premenopausal women with and without abnormal bleeding. *Obstet Gynecol.* 1999;94(4):516–20.
 22. Saheta A, Hariharan C, Sharma U. Abnormal uterine bleeding. *IOSR -JDMS.* 2014;13(11):63–7.
 23. Bennett GL, Andreotti RF, Lee SI, Allison SOD, Brown DL, Dubinsky T, et al. ACR Appropriateness Criteria ® on Abnormal Vaginal Bleeding. *JACR* [Internet]. 2011;8(7):460–8. Available from: <http://dx.doi.org/10.1016/j.jacr.2011.03.011>
 24. Marie KJ, Ndoua N, Cyrille C et al. Epidemiological Profile of Abnormal Uterine Bleeding at the Gyneco-Obstetric and Pediatric Hospital of Yaounde. *open J Obstet Gynecol.* 2020;10:237–42.
 25. Shichenje G, Id M, Mwaliko E, Kirwa P. Clinical bleeding patterns and management techniques of abnormal uterine bleeding at a teaching and referral hospital in Western Kenya. *PLoS One* [Internet]. 2020;15(12):1–9. Available from: <http://dx.doi.org/10.1371/journal.pone.0243166>
 26. Choudhury SA, Nath P. Abnormal uterine bleeding ; its prevalence , causes and management in a tertiary care hospital. *N Indian J OBGYN.* 2020;7(1):52–7.
 27. Belcaro C, Scrimin F, Mangogna A, Galati EF, Bi S, Monasta L, et al. diagnostics Comparison between Different Diagnostic Strategies in Low-Risk Reproductive Age and Pre-Menopausal Women Presenting Abnormal Uterine Bleeding. *Diagnostics.* 2020;10(11):1–11.
 28. Shukla S, Acharya N et al. Comparative Study of Transvaginal Sonography and Hysteroscopy for the Detection of Endometrial Lesions in Women with Abnormal Uterine Bleeding in Perimenopausal Age

- Group. *J South Asian Fed Obstet Gynaecol.* 2018;10(3r):155–60.
29. K. AK, P. S, Sampathkumar S. Study of hysteroscopic evaluation in patients with abnormal uterine bleeding. *Int J Reprod Contraception, Obstet Gynecol.* 2017;6(4):1413.
30. Zimmermann A, Bernuit D, Gerlinger C, Schaeffers M, Geppert K. Prevalence, symptoms and management of uterine fibroids: An international internet-based survey of 21,746 women. *BMC Womens Health.* 2012;12.
31. E.Bulun S. Uterine fibroids. *N Engl J Med.* 2013;221(15):361–4.
32. Kwak Y, Id YK, Baek KA. Prevalence of irregular menstruation according to socioeconomic status : A population-based nationwide cross-sectional study. *PLoS One.* 2019;14(3):1–12.
33. Naftalin J, Hoo W, Pateman K, Mavrellos D, Foo X, Jurkovic D. Is adenomyosis associated with menorrhagia ? *Hum Reprod.* 2014;29(3):473–9.
34. Kumar S. Clinicopathological Study of Abnormal Uterine Bleeding in North Indian Patients. *Asian J Biomed Pharm Sci.* 2016;6(53):50–1.
35. Shapley M, Blagojevic-Bucknall M, Jordan KP, Croft PR. The epidemiology of self-reported intermenstrual and postcoital bleeding in the perimenopausal years. *BJOG An Int J Obstet Gynaecol.* 2013;120(11):1348–55.
36. Sabre A, Serventi L, Nuritdinova D, Schiattarella A, Sisti G. Abnormal uterine bleeding types according to the PALM-COEIN FIGO classification in a medically underserved American community. *J Turkish Ger Gynecol Assoc.* 2021;22:91–6.
37. Litta P, Di Giuseppe J, Moriconi L, Delli Carpini G, Piermartiri MG, Ciavattini A. Predictors of malignancy in endometrial polyps: A multi-institutional cohort study. *Eur J Gynaecol Oncol.* 2014;35(4):382–6.
38. Gin N, Jervas E, Ko N, Wc O, Ki N. The Occurrence of Uterine Benign Diseases and their Histomorphologic Journal of Forensic Pathology The Occurrence of Uterine Benign Diseases and their Histomorphologic Characters. *J Foren Path, an open access J.* 2017;2(1):1–7.
39. Marino JL, Eskenazi B, Warner M, Samuels S, Vercellini P, Gavoni N, et al. Uterine leiomyoma and menstrual cycle characteristics in a population-based cohort study. *Hum Reprod.* 2004;19(10):2350–5.
40. Chaurasia DTA, Patidar DM, Chaurasia DI. To study the menstrual pattern in cases of women with ovarian masses. *Int J Clin Obstet Gynaecol.* 2020;4(3):91–2.
41. Varghese H, Abdul M, Qureshi S, Ronghe A, Vyas A, Singh R. Prevalence and Sociodemographic Covariates of Cervical Cancer and Its Association With Menstrual Irregularities : Findings From the 2017 National Inpatient Sample Database. 2021;13(10).
42. Radin RG, Rosenberg L, Palmer JR, Cozier YC, Kumanyika SK, Wise LA. Hypertension and risk of uterine leiomyomata in US black women. *Hum Reprod.* 2012;27(5):1504–9.
43. Reis N, Beji NK, Kilic D. Risk factors for cervical cancer: Results from a hospital-based case-control study. *UHOD - Uluslararası Hematol Derg.* 2011;21(3):153–9.
44. Sharma P, Pattanshetty SM. A study on risk factors of cervical cancer among patients attending a tertiary care hospital: A case-control study. *Clin Epidemiol Glob Heal [Internet].* 2018;6(2):83–7. Available from: <https://doi.org/10.1016/j.cegh.2017.10.001>
45. Ferreira I, Koifman RJ, Augusto V, Parreira G, Soares S, Koifman S. Risk Factors for Cervical Cancer in a Sample Comprising Three Generations of Brazilian Women. *J Cancer Ther.* 2017;8(1):12–25.
46. Kafuruki L, Rambau PF, Massinde A, Masalu N. Prevalence and predictors of Cervical Intraepithelial



Neoplasia among HIV infected women at Bugando Medical Centre ,. *Infect Agent Cancer*. 2013;1–8.