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Original Research Article

Echo-Anatomy of the Uterus of Pubescent Girls in Lomé (Togo) and its Correlation with the Occurrence of Dysmenorrhea

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ABSTRACT

Introduction: This study aimed to examine the echo morphometry of the uterus in pubescent girls in Lomé and its potential relationship with essential dysmenorrhoea. Essential dysmenorrhoea, characterized by menstrual pain without identifiable causes, affects a significant portion of young women.

Methodology: This was a preliminary, prospective, cross-sectional, descriptive, and analytical study performed over six months in the anatomy laboratory of the University of Lomé (Togo), at a teaching hospital Campus and in a school in Lomé. The study was based on a convenience sample of 100 pubescent, nulligravid pupils aged between 13 and 18 years with no pelvic surgery history.

Results: Dysmenorrhea was noted in 60% of cases. No abnormality of uterine shape or structure was observed. In seven percent of cases, uterine malposition's such as retroflection and retroversion were noted. There was a statistically significant correlation between uterine retroflection and the occurrence of dysmenorrhoea. The values of the biometric parameters tended to increase in girls with dysmenorrhoea.

Conclusion: To corroborate the results of the aforementioned preliminary work, a subsequent study on the same sample using a more objective means of exploration than ultrasound is necessary.

KEYWORDS: Echo-Anatomy, Uterus, Dysmenorrhoea, Lomé (Togo).

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INTRODUCTION

The uterus is a smooth, hollow, contractile muscular organ designed to contain the conceptus during its development and to expel it at term [1]. This function explains the profound changes undergone by the uterus during genital life. The cyclic changes in its mucous membrane lead to menstruation in the final phase without implantation [2].

In some women, these menstrual periods may be preceded and/or accompanied by pain that defines dysmeSnorrhoea. In 50% of cases, no cause is found for dysmenorrhoea in young women [3].

Therefore, the etiopathogenic clues to this so-called essential and primary dysmenorrhoea are constructed on family history, genetic risk factors, precocious puberty, and

possible uterine malposition [4, 5, 6]. The aim of this study was to investigate the echo morphometry of the uterus of pubescent girls in Lomé and its correlation with the occurrence of essential dysmenorrhoea.

METHODS

We performed a preliminary, prospective, cross-sectional, descriptive, and analytical study over six months, jointly in the human anatomy laboratory of the University of Lomé (Togo), at the teaching hospital Campus (C.H.U.-Campus) and in a school in Lomé. The study was based on a convenience sampling of 100 volunteer pupils, pubescent, nulligravid, with no history of pelvic surgery, aged between 13 and 18 years included. The sample was divided into five age groups of 20 students each. Pupils with congenital and/or traumatic pelvic deformities were excluded from the aforementioned study. The parameters studied were clinical and ultrasound.

The clinical parameters were the students' ages, menarche ages, body mass indexes, durations and phases of menstrual cycles, history of dysmenorrhoea, dysmenorrhoea intensities, and their impact on quality of life. The intensity of dysmenorrhoea was assessed using a visual analogue scale (VAS). Dysmenorrhoea was described as mild if the VAS was between one and three, moderate if the VAS was between four and six, and severe if the VAS was seven or more. Dysmenorrhoea was described as disabling when their intensities were the cause of school absenteeism or when it prevented pupils from taking part in school sports activities and/or carrying out common domestic tasks.

Ultrasound data were represented by shapes, orientations, biometric values, and uterine structures. Ultrasound scans were performed suprapubically on a full or semi-full bladder in all students by a radiologist (a woman) in strict privacy, in the presence of a parent or guardian. Figure 1 reveals the measurement of uterine biometry values in one student. On ultrasound, the uterus was described as anteflexed in students when the axis of the body and cervix formed an open angle to the front and retroflexed when this angle was open to the rear. The uterine version was determined in relation to the horizontal axis passing through the central point of the uterus situated at the isthmus: anteversion was characterized by a uterine body situated in front of this axis (figure 2), and when the uterine body was situated behind this axis, we spoke of uterine retroversion.

Data analysis was carried out using SPSS statistical software. Statistical tests were carried out to establish possible correlations between comparable data. A correlation was statistically significant when the "p-value was less than 0.05."

The participation of voluntary students in the study was conditioned by written parental authorization and that of the headmaster of the chosen school. Authorization from the bioethics committee for scientific research of the Ministry of Health of Togo was also obtained for the aforementioned study.

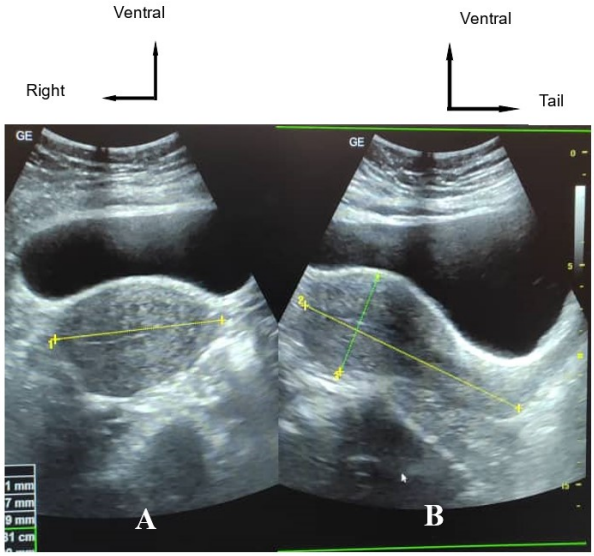

Fig. 1: Transverse (A) and sagittal (B) mucocavitary sections of the uterus via the suprapubic approach, with biometric markings.
Legend: measurement of width in yellow on (A); measurement of length in yellow and thickness in green on (B).

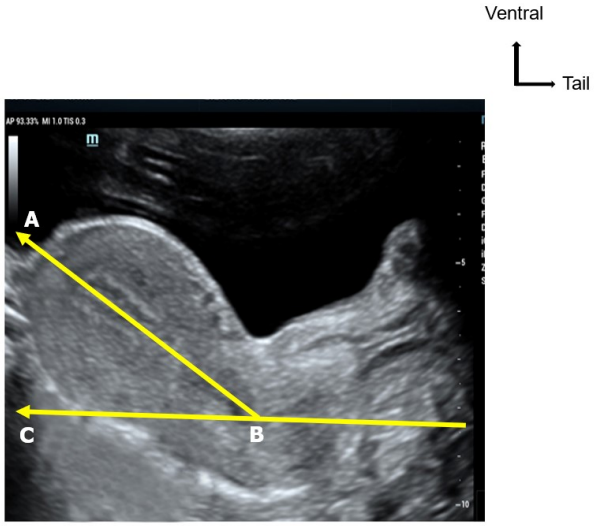

Fig. 2: Ultrasound sagittal section of the anteflexed uterus through the suprapubital approach showing the markers determining anteversion.
Legend: [BA) = axis of the uterine body, [BC) = horizontal line passing through the isthmus, B = central point of the uterus; [BA) situated in front of [BC).

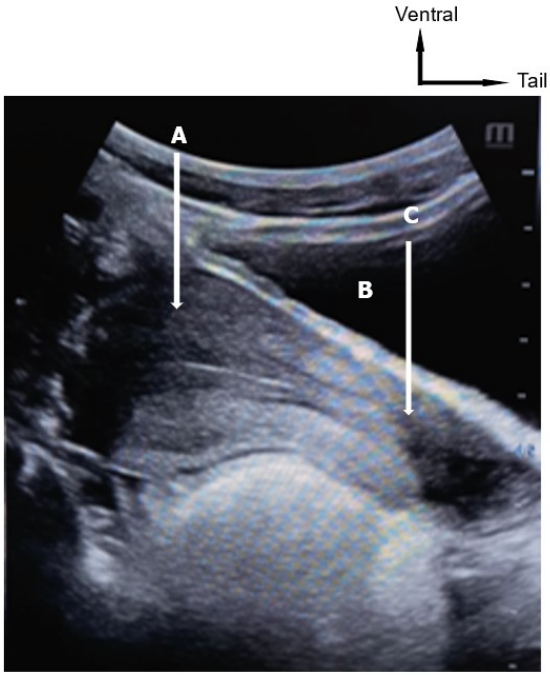

Fig. 3: Suprapubic ultrasound sagittal section showing an anteverted and retroflexed uterus.
Legend: A = uterine body; B = bladder; C = cervix.

RESULTS

Clinical data: The average age was 15.5, with extremes of 13 and 18 and a standard deviation of 1.42. The average height of the pupils was 1.65 m, with an average weight of 68 kg and an average body mass index (BMI) of 25.65 kg/m2.

Forty-three percent (43%) of the students had their menarche before the age of 13, 38% at 13, and 19% after 13. Dysmenorrhoea was present in 60% of pupils and absent in 40% of cases. These were primary dysmenorrhoea, which appeared between 03 and 10 months after menarche. Our work showed no statistically significant correlation between BMI and the occurrence of dysmenorrhoea (*p=0.521*).

Dysmenorrhoea was severe and disabling in 21.7% of cases and moderate and mild in 65% and 13.13% of cases, respectively. Thirty-six percent (36%) of the pupils had a history of dysmenorrhoea in their maternal families. A statistically significant correlation was noted between dysmenorrhoea in the pupils and the family history of dysmenorrhoea (*p=0.001*).

Ultrasound data: Each student had a uterus of normal shape, with regular contours and without signs of malformation. Uterine malpositions were observed in seven girls, i.e., 7%, with three cases of the retroverted and retroflexed uterus and four cases of the anteverted retroflexed uterus. Figure 3 shows an anteverted and retroflexed uterus. A statistically significant correlation was observed between retroflexion and dysmenorrhoea with a p-value less than 0.001 (Table 1).

Although there was no statistically significant difference (*p=0.149*), the values of uterine biometry parameters tended to increase in the group of students with dysmenorrhoea compared with those without dysmenorrhoea (Table 2).

Table 1: distribution of uterine orientations according to the presence or absence of dysmenorrhoea.

		Presence of dysmenorrhoea	Absence of dysmenorrhoea	%	*p value*
	SAMPLE	**60**	**40**	**100**	
VERSION	Anteversion	57	40	97	
	Retroversion	**3**	0	**3**	***0.025***
FLEXION	Anteflexion	53	40	93	
	Retroflexion	**7**	0	**7**	***<0.001***

Table 2: Distribution of averages of uterine biometric parameters according to the presence or absence of dysmenorrhoea.

	Presence of dysmenorrhoea	Absence of dysmenorrhoea	*p value*
Sample	**60**	**40**	
Average length(mm)	70,16	68,67	0,149
Average width (mm)	41,95	40,20	0,602
Average thickness (mm)	30,88	30,22	0,454
Average of endometrial thickness (mm)	7,16	7,02	0,861
Average volume (cm^3)	45,44	41,71	0,595

DISCUSSION

Limits of the study: As ultrasound is an operator-dependent examination, the data from the ultrasonographic study of the uterus may be biased. Additionally, when performed on a full or semi-full bladder, uterine ultrasound may be biased in the assessment of various positional and biometric parameters. To minimize these biases in this preliminary study, the ultrasound scans were performed by a single specialist experienced in medical imaging.

Results analysis: Menstrual disorders in adolescent girls are the main reason for consultation, and dysmenorrhoea is the most frequently presented gynecological problem [7, 8]. To this end, several studies have focused on primary dysmenorrhoea, with results that are as relevant as varied:

In 2005, a study carried out in Canada found 60% of primary dysmenorrhoea in young women aged 18 [9].

In 1988, Johnson [10] found a prevalence of 72.7% in the USA among people aged between 14 and 18.

The prevalence was 55% in Croatia and 73% in China in adolescent girls in 2003 and 2005, respectively [11, 12].

In Africa, an Egyptian study focused on 664 secondary school girls in 2005 reported 75% of dysmenorrhoea, and in Ghana, the prevalence was 74.4% in 2012 in adolescent girls aged between 14 and 19 [13, 14].

The prevalence of 60% noted in our work corresponds to the above-mentioned data. It falls broadly within the range of 30 to 90% mentioned by Hong and others [15] in their epidemiological study of dysmenorrhoea in 2014. On the other hand, the results are not uniform regarding the prevalence of severe dysmenorrhoea. They vary from 5% to 42% in the above-mentioned studies. In our study, severe and disabling dysmenorrhoea was found in 21.7% of cases. Indeed, the assessment of the severity of pain is a subjective practice and subject to by great variations.

Several studies have made it possible to map the risk factors involved in the occurrence of dysmenorrhoea; according to the results of these studies, it is a question of family history of dysmenorrhoea, precocious age of menarche, prolonged duration of menstruation, and excessive weight [16,17]. In our study, a statistically significant correlation (*p=0.001*) was observed between family history of dysmenorrhoea and the presence of dysmenorrhoea in adolescent girls. Without noting, however, a statistically significant correlation, there was a tendency for adolescent girls with dysmenorrhoea to have a BMI greater than 25 kg/m2.

The uterus is normally anteverted and anteflexed due to the combined actions of uterine static factors [1,2]. This was the case for 93% of the students who participated in this study. However, in seven students (7%), we observed cases of uterine malpositions such as retroversion and retroflexion, thus confirming the rarity of these malpositions. The prevalence of 20 to 25% noted in the literature concerns all types of positional anomalies of the uterus, accompanied or not by dysmenorrhoea, in the female population regardless of age [18]. Sahin and others [19] established a relationship between the angle

Table 3: Comparison of uterine biometry results with literature data.

Authors and years of study	Sample size	Average age (years)	Average length (cm)	Average width (cm)	Average thickness of the uterus (cm)	Average volume (cm^3)	Average of endometrial thickness (mm)
Bumbuliene Z *et al. 2014 [21]*	40	16.3±1,2 [13.28-18.64]	7.31± 0.91	4.18± 0.55	3.11± 0.51	31,74±10.62	5.35±2.28
Sahin ME *and al* 2018 [19]	50	17.5±1.28 [16-20}	7,68±3.3	3.32±2.18	absent	absent	absent
Our study	**100**	**1.5 [13–18]**	**6.87±2.96**	**3.85± 4.21**	**3.2± 4.61**	**44.8±0.4**	**5.9±6.18**

of uterine flexion and the occurrence of dysmenorrhoea and their severity. Our study also noted a statistically significant correlation (*p<0.001*) between uterine flexion disorders and dysmenorrhoea. Kim and others [20], in their study on the issue in 2016, not only established the correlation between uterine malpositions and dysmenorrhoea, but also mentioned a possible association of pelvic anomalies in these patients.

The comparison drawn up in Table 3 makes it easier to analyze our uterine biometric results in relation to the data from other studies.

The discreet differences observed between our results and those of the authors [19, 21] appearing in Table III can be explained by the differences in ages, the sizes of the samples but also by the fact that they are all ultrasound measurements the results of which are operator-dependent. Despite these variations, our work's average dimensions of the uterus fall within the established anatomical limits.

Additionally, we did not note a statistically significant correlation between biometric data and the occurrence of dysmenorrhoea in the students (*p= {0.149; 0.602; 0.454}* respectively for lengths, widths, and thicknesses). This observation is consistent with the points of view of other authors in the literature [19, 22, 23].

CONCLUSION

Our study focused on a convenience sample, of which more than half suffered from dysmenorrhoea. The statistical analysis of the uterine echo-anatomy parameters of the enrolled students showed that uterine malpositions were the anatomical factors that could explain this dysmenorrhoea. Ultrasound being an operator-dependent examination, the study of the uterus of the students in our sample should be resumed subsequently by another more objective means of exploration scanner or magnetic resonance imaging) to impute definitive dysmenorrhoea with positional abnormalities in those involved.

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Author Contributions

The co-authors contributed by reading and verified the images of manuscript. Adjenou komlanvi V. and Hounnou Gervais M. are our boss and they oversee the manuscript

Conflicts of Interests: None

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