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Original Research Article

Sonographic Size of Normal Uterus in Pre and Post-Menopausal Women and its Correlation with BMI

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Abstract: *Background:* Uterus is a pear shaped muscular retroperitoneal organ. It has three layers Endometrium, myometrium and perimetrium. *Aim:* To determine the sonographic size of normal uterus in pre and post-menopausal women and its correlation with BMI. *Material And Method:* This study consists of 150 women (115 parous &35 nulliparous) had sonography with abdominal and /or pelvic problem non-relating to uterus in both parous and nulliparous women. Uterine measurements are assessed and associated with age, height, and weight and correlated with pre and post-menopausal women. *Results:* The result showed that the size of uterus (length×width×height) from 11to 30 years is (7 ×3 ×4), from 31 to 40 is (7× 4 × 5), from 41 to 50 years is (7×4 × 5), and from 50 to 6o years is (7 × 3 ×4). From 60 to 90 year's uterus length decreases. In 60 to 70 years is (6.1 × 2 ×2), from 71 to 80 years is (4 ×3×2) from 81 to 90 years is (5 × 2 × 3). In my study there was insignificant correlation of uterus dimensions with BMI. *Conclusion:* On the beginning of the current work next inference was strained. The uterine length rises with rise in age in from 11 to 60 years and reduction in 61 to 90 years' age. Negative correlation between uterine length and BMI. There is insignificant correlation of uterus dimensions with BMI.
Keywords: Uterus, ultrasonography, BMI, uterine length, width, height, pre and post-menopausal.

INTRODUCTION

The uterus is a widening retroperitoneal organ that is partially attached by the wide ligaments and located in front of rectum and behind to the urinary bladder(Omer, 2018). The uterus is well-developed organ that is distributed into two portions: the cervix and the corpus. Representative uterine values of uterine dimensions are 7.6x4.5x3 inches.(Parmar *et al.,* 2016).The uterus is a muscular organ with a hollow interior and thick wall. Its internal structure is made up of a muscular layer called the myometrium, which makes up the majority part of the uterus and a mucous layer called the endometrium, which is firmly attached to the myometrium(Mohamed, 2020). The position of the uterus within the pelvis varies. The uterus is normally found in an anteverted or antiflexion posture. The uterine location in the body lists forward, producing a 90-degree angle with the cervix is known as ante verted. The condition in which the uterine body wrinkles onward and arises into touch with cervix, generating an acute angle between the body and the cervix, is known as ante flexion of the uterus. The uterine body tilts backward and comes into touch with the cervix, generating an acute angle between the body and the cervix. The uterine body tilts backward without bend where the cervix and body meet, resulting in retroversion of the uterus. The uterus might too be orientated to the left-hand or right of the midline, causing an anatomic and functional midline difference (Penny, 2018).

Menstruation, implantation, gestation, labor, and delivery are all carried out by the uterus, which is a dynamic female reproductive organ.(Umar *et al.,* 2017) The uterine and ovarian arteries, which emerge since the forward division of the internal iliac artery, source blood to the uterus. The main blood vessels that give

blood to the uterus are the uterine arteries. The arcuate arteries branch into the radial arteries as the blood supply enters the myometrium. The uterine arteries give blood to the various sections of the uterus and are crucial for blood flow throughout menstrual cycles and pregnancy(Arya *et al.,* 2021). The uterus is a remarkable organ that permits women to get pregnant and give birth to new life. However, this function is lost in a small fraction of women's wombs. The uterus' work is partial by a variety of aspects, the most major of which are changes in its size and shape. Congenital uterine malformation, for example, is well known to reason infertility in women. Calculating the uterus's size and form can aid us well know how it relates to female infertility(Gao *et al.,* 2018). The optimal uterine size and volume (length, width, and anteroposterior diameter) ensure the highest clinical pregnancy rates*(Gao et al.,* 2019) The measurement of uterine length is crucial in the diagnosis and treatment of uterine infertility caused by a variety of uterine reasons.(Hawkins *et al.,* 2013) Gynecologists are familiar with the normal anatomical appearance of the uterus, which may be familiar instantly on ultrasound inspection or by straight image(Verguts *et al.,* 2013). Ultrasonography, a non-invasive technology, has been reported to be commonly used in the evaluation of the female genital tract; this is due to the fact that it reduces patient exposure to ionizing radiation and allows multi-sectioning scanning of soft tissues such as the uterus(Mihu *et al.,* 2011). A pelvic ultrasound scan, which may include a trans-abdominal or trans-vaginal scan, is used to visualize the uterus in uterine ultrasonography. The size and position of the uterus can be seen with the help of the urinary bladder in a transabdominal scan, whereas the internal anatomy of the uterus can be seen in a trans-vaginal scan(CHRIS-OZOKO *et al.,*). The resolution of this study was to sonographically control the size of normal uterus in pre and post-menopausal women correlation with BMI

MATERIAL AND METHOD

A commercially available real-time US system was used to perform transabdominal sonography by Toshiba machine. This was accomplished using a sector transducer with a frequency of 3.5 MHz, by using acoustic gel medium, to avoiding the problems that comes from the friction with the Skin of the abdomen. This research was carried out by performed between the dates of from January 14th, 2022 to February 14th, 2022. Estimated the total number of participants was 150. Subjects were told to consume roughly 500-600 mL of water 1000 mL water to encourage diuresis and to keep micturition to a minimum until the assessment. All of the topics were in both cases; scans were performed in the supine position by using planes (longitudinal and transverse).The size of the uterus is determined by three factors. Direct measurements taken from for each of the following, create a frozen image. Settings with the help of a built-in caliper (Abdullah, 2019).

Enclosure principles all non-pregnant mature females amongst the ages of 18-50 years. Women with no intrauterine pathologies such as leiomyoma, adenomyosis, Gestational trophoblastic syndromes. Elimination principles All pregnant women, Women in puerperium, History of previous intrauterine pathologies. Incidental discovery of uterine leiomyoma, adenomyosis and pelvic inflammatory disease women with hysterectomy.

RESULT

The result showed that the size of uterus (length×width×height) from 11to 30 years is (7 ×3 ×4), from 31 to 40 is (7× 4 × 5), from 41 to 50 years is (7×4 × 5), and from 50 to 6o years is (7 × 3 ×4). From 60 to 90 years' uterus length decreases in 60 to 70 years is (6.1 × 2 ×2), from 71 to 80 years is (4 ×3×2) from 81 to 90 years is (5 × 2 × 3). Table 1:

Table 1: Showing Correlation with Age of Uterus

STATISTICS				
Age Group (Years)		Uterus Length	Uterus Width	Uterus Height
11-20	Mean	7.0833	3.1917	4.0167
	Std. Deviation	1.07520	.66805	.72843
21-30	Mean	7.3604	3.6377	4.1830
	Std. Deviation	1.17577	.70635	.88137
31-40	Mean	7.7350	4.9425	5.3525
	Std. Deviation	1.55325	5.43969	4.55170
41-50	Mean	8.5111	3.8519	5.3407
	Std. Deviation	7.33135	.89588	5.62879
51-60	Mean	7.0429	3.5857	4.2286
	Std. Deviation	2.48835	.60746	1.27063
61-70	Mean	6.1000	2.8000	2.7500
	Std. Deviation	.14142	.42426	.35355
71-80	Mean	3.9000	2.0000	3.0000
81-90	Mean	5.0000	2.0000	3.0000

The dimensions of the uterus including (length×width×height) in BMI from 16-16.9 shows (5.8 ×3.1×3.4), from 17-18.4 shows (7.7×3.5×4.7), 18.5-24.9 shows (7.0×3.6×4.5), 25-29.9 shows (7.5×4.5×5.1), 30-34.9 shows (9.1×3.6×3.9), 35-39.9 shows (7.8×4.2×4.5) and >40 shows mean of (8.1×4.7×3.9) described in table 2: according to group

Table 2: Shows the Mean and Standard Deviation of the Uterus in BMI Groups

STATISTICS				
Bmi Group		**Uterus Length**	**Uterus Width**	**Uterus Height**
16-16.9	Mean	5.8333	3.1000	3.4000
	Std. Deviation	.80829	.34641	.36056
17-18.4	Mean	7.7800	3.5600	4.7400
	Std. Deviation	.96281	.71624	.99146
18.5-24.9	Mean	7.0841	3.6175	4.5810
	Std. Deviation	1.60103	.93594	3.76567
25-29.9	Mean	7.5585	4.5113	5.1170
	Std. Deviation	1.76999	4.75252	4.00056
30-34.9	Mean	9.1650	3.6300	3.9200
	Std. Deviation	8.27407	.84797	.97311
35-39.9	Mean	7.8600	4.2400	4.5800
	Std. Deviation	1.71843	.20736	.67602
>40	Mean	8.1000	4.7000	3.9000

In age group 11-20 years with zero and one parity uterus dimensions (length×widht×height) is 7.4×3.8×4.7, with parity 2 the dimension was (4.3×1.7×2.5), parity 3 shows (7.5×3.6×4.0) and parity 4 shows (7.1×2.8×3.7). Shown in graph-1

In age group 21-30 years with zero parity shows uterus dimensions (7.1×3.4×4.2), parity 1 shows (7.9×4.2×4.2), parity 2 shows (6.5×4.2×4.0), parity 3 shows (7.3×3.7×4.7) and parity 4 shows (7.6×4.0×4.3). Shown in graph-2

In age group 31-40 years with zero parity shows uterus dimensions (7.6×4.3×7.6), parity 1 shows (3.5×4.8×5.7), parity 2 shows (5.7×3.8×4.9), parity 3 shows (6.7×4.2×4.2), parity 4 shows (8.7×4.6×5.0), parity 5 shows (7.8×4.0×5.3), parity 8 shows (8.6×4.2×7.0), parity 9 shows (8.7×3.9×4.0). Shown in graph-3

In age group 41-50 years with zero parity shows (8.1×4.2×5.0), parity 1 shows (7.1×3.0×4.3), parity 2 shows (4.7×4.3×3.0), parity 3 shows (4.0×2.0×3.0), parity 4 shows (7.2×4.1×5.3), parity 5 shows (7.4×3.7×4.8), parity 6 shows (8.5×4.0×5.0).

In age group 51-60 years with zero parity shows (8.9×3.8×5.3), parity 1 shows (7.0×3.4×4.0), parity 2 shows (7.6×3.7×4.1), parity 3 shows (7.6×3.7×4.1), parity 4 shows (6.0×3.1×3.0), parity 5 shows (7.7×3.7×4.4). Shown in graph-4
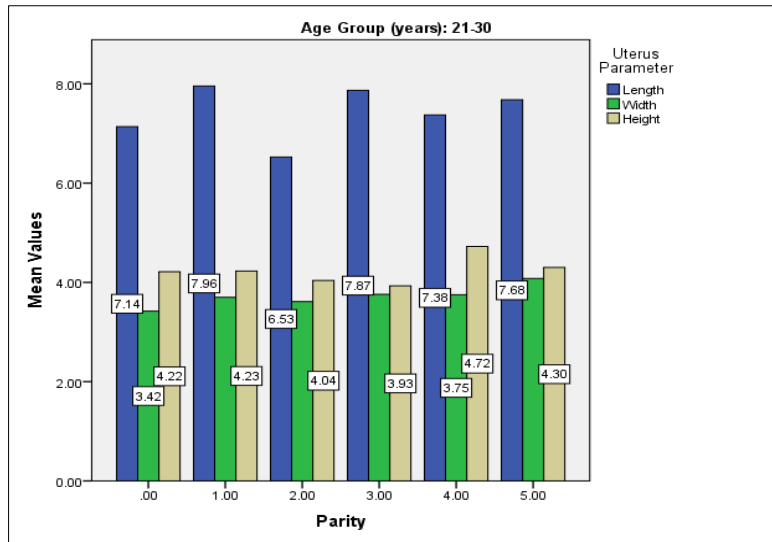
In age group 61-70 years with parity 3 shows uterus dimension (6.2×3.1×3.0), parity 4 show (6.0×2.5×2.5). Shown in graph-5

In age group 70-80 years' parity 3 of the uterus shows (3.9×2.0×3.0). Shown in graph-6
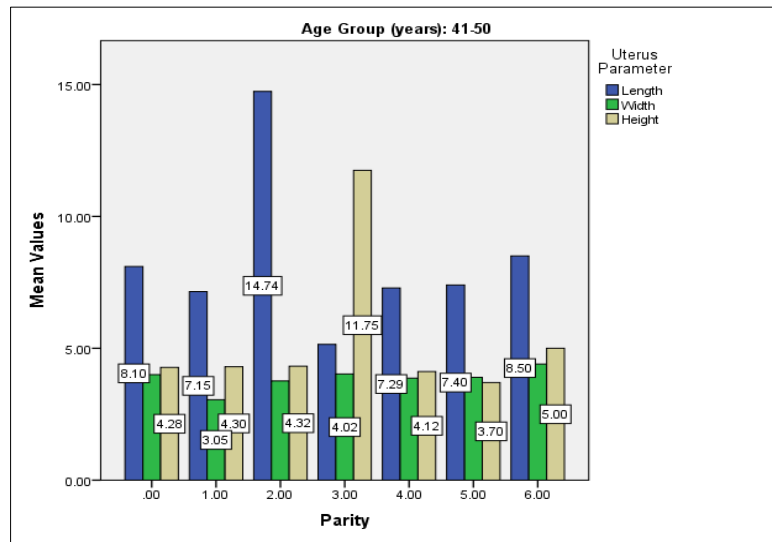
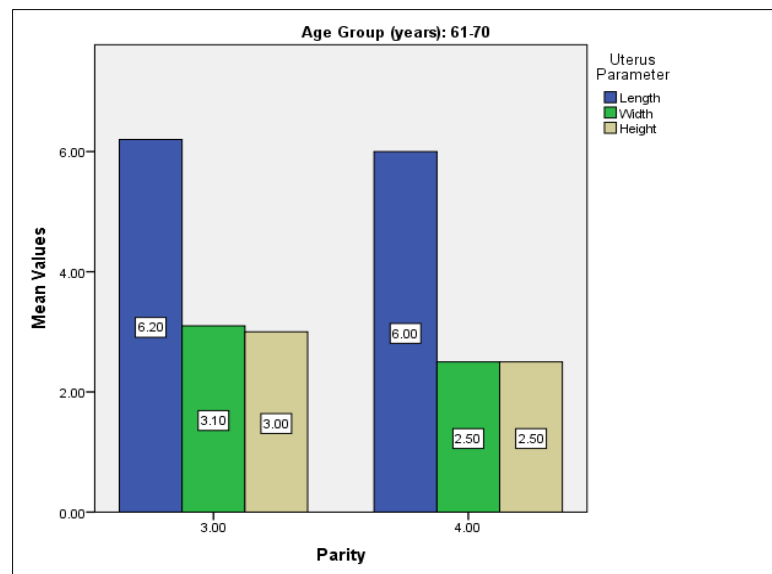In age group 81-90 years' parity zero shows (5.0×2.0×3.0). Shown in graph-7
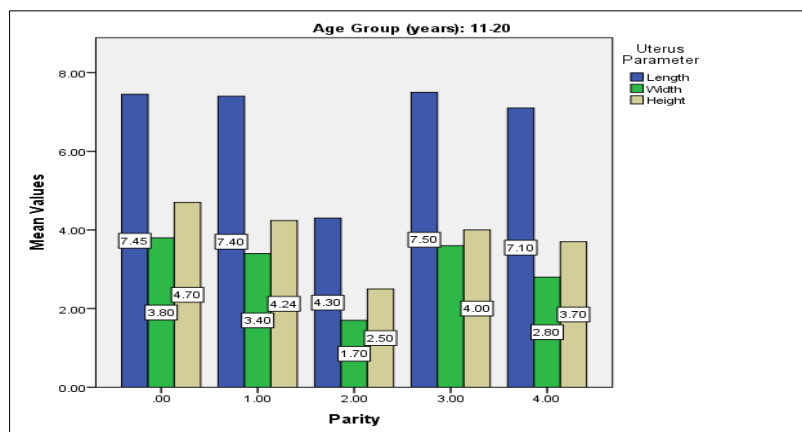
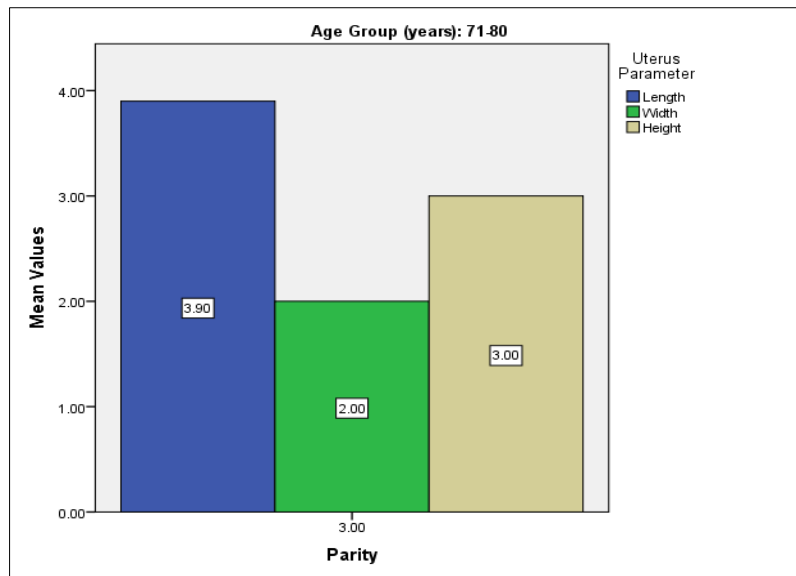**Graph 1: Shows Female Parity during 11-20 Years**
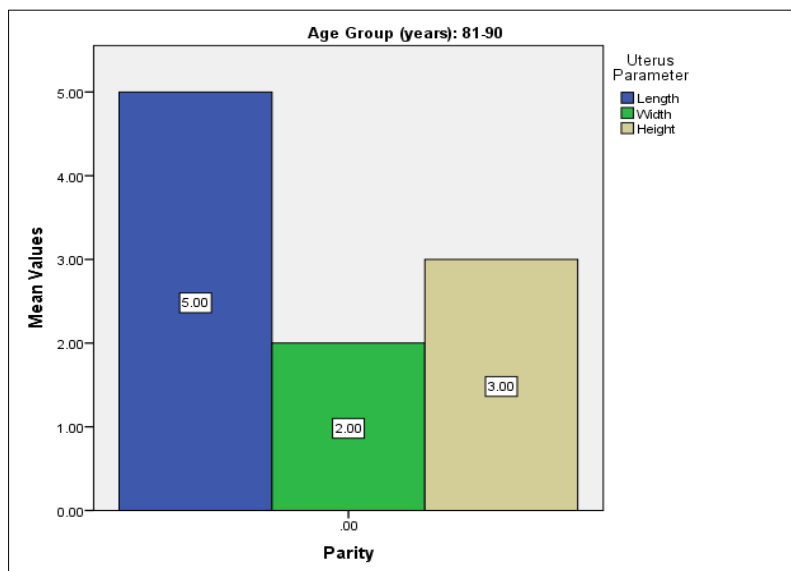
Graph 2: Shows Female Parity during 21-30

Graph-3: Shows Female Parity during 41-50

Graph-4: Shows Female Parity during 61-70

Graph-5: Shows Female Parity during 71-80

Graph-6: Shows Female Parity during 81-90

DISCUSSION

The magnitude of the uterus differs from individual the individual. Transabdominal ultrasonography was used to arrange uterine size. The purpose of this study was to regulate the regular uterine magnitudes in equally parous and nulliparous women. Moawia Gamersddin's previous study discovered a major drop in all uterine metrics excluding cervical length. Since then, mutually the age and the period have distended(Parmar *et al.,* 2016). It is not unusual for full sonologists to deliver one uterine measurement, the vertical measurement, which is insupportable, since in balanced preparation all three dimensions are essential. A result to continue with surgery using miscalculated uterine size or without evaluating the uterine volume can source matters during surgery.(Sheth *et al.,* 2017) IN My study result showed that the size of uterus (length×width×height) from 11to 30 years is (7 ×3 ×4),

from 31 to 40 is (7× 4 × 5), from 41 to 50 years is (7×4 × 5), from 50 to 6o years is (7 × 3 ×4). From 60 to 90 years' uterus length decreases in 60 to 70 years is (6.1 × 2 ×2), from 71 to 80 years is (4 ×3×2) from 81 to 90 years is (5 × 2 × 3). The dimensions of the uterus including (length×width×height) in BMI from 16-16.9 shows (5.8 ×3.1×3.4), from 17-18.4 shows (7.7×3.5×4.7), 18.5-24.9 shows (7.0×3.6×4.5), 25-29.9 shows (7.5×4.5×5.1), 30-34.9 shows (9.1×3.6×3.9), 35-39.9 shows (7.8×4.2×4.5) and >40 shows mean of (8.1×4.7×3.9) described in table2: according to grouping. In age group 11-20 years with zero and one parity uterus dimensions (length×widht×height) is 7.4×3.8×4.7, with parity 2 the dimension was (4.3×1.7×2.5), parity 3 shows (7.5×3.6×4.0) and parity 4 shows (7.1×2.8×3.7). In age group 21-30 years with zero parity shows uterus dimensions (7.1×3.4×4.2), parity 1 shows (7.9×4.2×4.2), parity 2 shows (6.5×4.2×4.0), parity 3 shows (7.3×3.7×4.7) and parity

4 shows (7.6×4.0×4.3). In age group 31-40 years with zero parity shows uterus dimensions (7.6×4.3×7.6), parity 1 shows (3.5×4.8×5.7), parity 2 shows (5.7×3.8×4.9), parity 3 shows (6.7×4.2×4.2), parity 4 shows (8.7×4.6×5.0), parity 5 shows (7.8×4.0×5.3), parity 8 shows (8.6×4.2×7.0), parity 9 shows (8.7×3.9×4.0). In age group 41-50 years with zero parity shows (8.1×4.2×5.0), parity 1 shows (7.1×3.0×4.3), parity 2 shows (4.7×4.3×3.0), parity 3 shows (4.0×2.0×3.0), parity 4 shows (7.2×4.1×5.3), parity 5 shows (7.4×3.7×4.8), parity 6 shows (8.5×4.0×5.0).In age group 51-60 years with zero parity shows (8.9×3.8×5.3), parity 1 shows (7.0×3.4×4.0), parity 2 shows (7.6×3.7×4.1), parity 3 shows (7.6×3.7×4.1), parity 4 shows (6.0×3.1×3.0), parity 5 shows (7.7×3.7×4.4). In age group 61-70 years with parity 3 shows uterus dimension (6.2×3.1×3.0), parity 4 show (6.0×2.5×2.5).

In age group 70-80 years' parity 3 of the uterus shows (3.9×2.0×3.0). Shown in graph-6

In age group 81-90 years' parity zero shows (5.0×2.0×3.0).

CONCLUSION

The study accomplishes that the uterine dimensions in pre and postmenopausal women. were restrained through ultrasound in 115 parous and 35 nulliparous women. On the origin of the existing work next inference were strained. With increasing age the uterine length get increased ranging from 11 to 60 years and reduces in the age group of 61to 90 years. Negative correlation between uterine dimension and BMI was noted.

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