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PREVALENCE OF LEIOMYOMA UTERI AMONG FERTILITY-CHALLENGED WOMEN IN ONITSHA METROPOLIS.

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ABSTRACT

Background: Infertility is a medical condition of the reproductive system, defined as the failure to achieve successful pregnancy after one year of unprotected sex. Uterine leiomyoma are the most common pelvic neoplasms affecting women. The clinical presentations of leiomyoma are variable and depend on the size and number of leiomyoma and the location of fibroids within the uterus. To evaluate the prevalence of leiomyoma among fertility-challenged women in Onitsha metropolis, Anambra State.

Materials and methods: This cross-sectional study was conducted among 500 women with fertility-challenge using ultrasound as the imaging modality after obtaining ethical approval from the Human Research and Ethical Committee of Nnamdi Azikiwe University Hospital, Nnewi. All the women were scanned using standard protocol and procedures for performing pelvic ultrasound with emphasis on the uterus and adnexae to determine the presence or otherwise of uterine fibroid masses. Data such as age, number, sizes, positions and location of fibroid masses were obtained using data captured sheet. Descriptive and inferential statistics were performed and the level of significance was set at $p < 0.05$.

Results: Out of 500 women, 36.4% (n=182) had uterine fibroids. There was a prevalence rate of 36.4%. The majority 56.59% (n=103) of those that had fibroid were within the age group of 31-40 years and the least 19.78% (n=36) were those within the age group of 41-50years. Out of the 401 fibroids identified, the majority 46.63% (n= 187) have sizes of 61mm and above and the least 2.74% (n= 11) had size of ≤ 20mm. Also, out of 182 women that had uterine fibroids, greater number 45.6% (n=83) had multiple numbers of fibroid and the least 24.18% (n=44) had double numbers of fibroid. The highest number 46.13% (n= 185) of fibroid was in the anterior position and the least 0.25% (n=1) was in the postero-fundal position. Large proportion 68.58% (n=275) were located in the intramural, followed by those located in the submucosal 15.46% (n=62) and the least 1.49% (n=6) were located in the intracavity. There were no statistically significant correlations of age with fibroid size (r= 0.635, p = 0.09), number of fibroid(r= 0.341, p = 0.24), positions (r= 0.427, p = 0.07) and locations (r= 0.616, p= 0.18).

Conclusion: The prevalence of fibroid in the study population is low. The fibroids were found at various positions and anatomical locations with majority in the anterior wall and intramural respectively. The age of the women did not have any significant impact on the number, sizes, position and locations of the fibroids.

Keywords: Fibroid, infertility, uterine

INTRODUCTION

Infertility is a medical condition of the reproductive system, defined as the failure to achieve a successful pregnancy after one year of unprotected sex. About 50% of the reasons for infertility

in couples are related to female disorders (Vander Borght & Wyns, 2018). About 60–80 million couples are affected by infertility worldwide, and the figures are increasing (Tabong and Adongo, 2013; Kawwass *et al.,* 2013). Infertility is divided into two groups: primary when a couple has not previously initiated a pregnancy and secondary when they have been successful with at least one previous pregnancy. It is reported to range from 0.6% to 3.4% for primary infertility and 8.9% to 32.6% for secondary infertility over the past ten years (WHO 2006; Elhussein *et al*., 2019; Direkvand-Moghadam *et al.,* 2013). Female infertility may be caused by an underlying variety of disorders, such as ovulation disorders, damaged fallopian tubes (tubal infertility), cervical disorders (benign polyps or tumours and cervical stenosis), and hormonal imbalances. These hormonal conditions include polycystic ovary syndrome (PCOS), endometriosis, premature ovarian failure (POF), hypothalamic dysfunction, hyperprolactinemia (too much prolactin), uterine fibroids, and pelvic inflammatory disease (PID).

Uterine fibroids, or uterine leiomyomas, are the most common pelvic neoplasms affecting women. (Stewart *et al*., 2017). The uterine fibroid is typically composed of disordered fascicles of smooth muscle cells, fibroblasts, and an excess of acellular extracellular matrix (Holdsworth-Carson *et al*., 2014). Uterine fibroid tend to be multiple and may be found in any part of the uterus; however, uterine fibroid are most common in the muscular wall of the uterus (the myometrium). Fibroids are rare before puberty, increase in prevalence during reproductive years, and decrease in size after menopause (Ishikawa *et al*., 2010). Fibroids are dependent on oestrogen and progesterone to grow and are therefore relevant only during reproductive years (Metwally 2015).

The uterine fibroid can range in size from a few millimetres to massive growths of 20 cm in diameter. Although uterine fibroids are benign tumours, they can cause a number of unpleasant side effects in a woman's life, including irregular and heavy menstrual bleeding, severe anaemia, dysmenorrhea, pelvic pressure and pain, even urinary incontinence, infertility, and early and recurrent miscarriages (Navarro *et al.,* 2021). The majority of women are asymptomatic, and fibroid masses often remain undiagnosed (Zimmermann *et al*., 2012). Among such women, the myoma may be discovered during investigation for other conditions (Divakar, 2008; Bulun, 2013; Gupta, 2008). Uterine fibroids are clinically apparent in 25% of women of reproductive age and in over 70% of women by menopause (Stewart *et al.,* 2017). Fibroids usually grow in women of childbearing age and may shrink after menopause. However, research also shows that fibroids are more likely to shrink in postmenopausal white women than in post menopausal black women. For African American women, fibroids typically develop at a younger age, grow larger, and cause more severe symptoms (Stewart, 2015). The incidence and prevalence of uterine fibroid reported in the literature vary significantly by study design, method of diagnosis, ethnic composition, and age distribution of study participants (Stewart *et al.,* 2017; Wise *et al.,* 2016). The cumulative incidence of uterine fibroid by the age of 50 in women in developed countries is 70%–80% (Stewart *et al*., 2017; Baird et al., 2003). Its reported incidence is likely to be an underestimation, as many tumours are asymptomatic or slightly symptomatic and therefore remain undiagnosed (Al-Hendy *et al*., 2017). In addition, approximately only 25% to 30% of women report the clinical symptoms of uterine fibroids (Stewart *et al*., 2016). Fibroids affect between 20 and 25% of women, affecting close to 235 million women, which represents 6.6% of the global female population as estimated worldwide (Ezeama *et al.,* 2012). Many women with fibroids experience symptoms like heavy menstrual bleeding, pain, or pressure in the pelvis. They might also have problems with pregnancy or infertility. Abnormal uterine bleeding is the most common symptom of uterine fibroids (Vilos *et al*., 2015).

Some large fibroids can exert pressure on surrounding organs and nerves, which can lead to more severe and noticeable symptoms. However, larger fibroids aren't always associated with more symptoms, like increased pain (Lippman *et al*., 2004). In one study, women with smaller intramural fibroids were more likely to report moderate or severe pain compared to patients without them (Lippman *et al.*, 2004). Uterine fibroids are a common diagnosis across the world, especially in middle age. However, because most fibroids are too small to be detected during a physical exam (Hopkins medicine), the actual global numbers are likely higher than what's reported. By country, here's how many people ages 40 to 49 have been diagnosed with fibroids in different parts of the world, according to a March 2012 study: In the United Kingdom, 4.5%, France 4.6%, Canada 5.5%, the U.S.A. 6.9%, Brazil 7%, Germany 8%, Korea 9%, and Italy 9.8% . In Africa, after reviewing 4,536 case files in Nigeria, it was found that about 20% of people identified as women had fibroids, 67% were between the ages of 26 and 35, only 30% were over 35, and 3% were under 26. After observing 656 people with uteruses in Ghana, researchers found that approximately 27% had fibroid (Elugwaraonu *et al.*, 2013). Previously documented prevalence's of uterine fibroids in Nigeria were hospital-based with varying denominators, thereby not reflecting the true prevalence of uterine fibroids in the country. A study done in South-Western Nigeria showed a prevalence of 6.83% in asymptomatic subjects (Ukwenya *et al.*, 2015); however, higher prevalence has been reported in some parts of Nigeria, especially the eastern part: 13.6% was obtained in Ebonyi State and 25% was reported in Enugu State. In northern Nigeria, the prevalence of uterine fibroid was estimated among asymptomatic women using ultrasound scans to be 12.1% (Lawal *et al*., 2019). This value is higher than the figure of 6.8% reported in south-western Nigeria (Ukwenye *et al.*, 2015).

Uterine fibroid is 3–9 times more common among black women of African descent than in Caucasians, which indicates a strong association with race and ethnicity (Machapali *et al*., 2013; Verma *et al*., 2013). The clinical presentation of fibroids is variable and depends on the size and number of fibroids and their location within the uterus. The diagnosis of uterine leiomyoma is mainly clinical, but ultrasonography is also useful. Often, the diagnosis of uterine leiomyoma is made incidentally during the investigation of other illnesses (Anate, 2007; Ogunniyi *et al*., 1990). Imaging techniques are the mainstay of diagnosis, with ultrasound being the most commonly used modality and the first choice of imaging modality in the field of gynaecology (Jeyalashmi *et al*., 2009). Dynamic and static images can be produced and displayed as a spectrum during ultrasound scanning. Ultrasound utilises non-ionising radiation, has no obvious untoward bio-effects, and has excellent soft tissue and pelvic organ resolution, like the uterus (Jayalashmi *et al*., 2009), thus making it a valuable tool in making a diagnosis in women with this condition (uterine leiomyoma). It's the preferred imaging modality for gynaecological investigations (Eze *et al*., 2013). Ultrasound is widely available, inexpensive, and usually definitive in its diagnosis. More so, with the advent of high-resolution vaginal probes, transvaginal sonography has assumed an important role in assessing the myometrium and the endometrial echo complex (Isa *et al*., 2011). Since the 1970s, the diagnosis of leiomyomas has been based on ultrasonography, and since the 1980s, when transvaginal scans were introduced; this has become the gold standard.

Magnetic resonance imaging (MRI) has the benefit of providing a better picture of the number, size, vascular supply, and boundaries of the fibroids as they relate to the pelvis (Wozniak 2017).
In developed nations where other imaging modalities such as magnetic resonance imaging (MRI), ultrasonography, and saline infusion sonography are available, fibroid can easily be diagnosed with better precision. In this regard, MRI is the preferred imaging modality for

characterising uterine fibroids and identifying their exact anatomical location; however, initial identification is usually done by ultrasonography (Wildes and Scott-Barrett, 2009).

On some rare occasions, fibroids may also be found incidentally on plain radiographs or computed tomography (CT) scans done for other indications (Wildes and Scott-Barrett, 2009).
In developing countries, ultrasound scanning is the most commonly available method of diagnosing and monitoring the growth of uterine fibroids. There is no consensus on whether transabdominal or transvaginal ultrasound scanning is the preferred method of diagnosing uterine fibroids. Transvaginal ultrasound scans are more sensitive for the diagnosis of small fibroids, and in skilled hands, a fibroid as small as 5cm can be detected on a transvaginal scan. However, when the uterus is retroverted or bulky, the uterine fundus may lie outside of the field of view, and in this scenario, a transabdominal ultrasound scan is a better option. Transabdominal views are often of limited value in obese patients (Khan *et al.,* 2014).

Leiomyoma represents a major public health problem among African women. Despite the high rates of leiomyoma diagnosis found in black women, there is a paucity of studies on fibroids cases in Onitsha, Anambra State. Therefore, this study aims to assess the prevalence of leiomyoma incidence among fertility-challenged women in Onitsha, Anambra State.

MATERIALS AND METHODS

Research design

This was a prospective cross-sectional study.

Area of study and target population

It was carried out in the Obstetrics and Gynaecology Department of the General Hospital in Onitsha, Anambra State. The study was carried out on all consenting subjects with fertility challenges undergoing pelvic ultrasound investigations at the Obstetrics and Gynaecology Department of General Hospital Onitsha. It lasted for a period of five months, beginning in February 2023 and ending in June 2023.
The study targeted all fertility-challenged women undergoing pelvic ultrasound investigations at the general hospital in Onitsha at the time of the study.

Sample size determination and sampling technique

A sample size of 500 patients were selected into this study based on the radiologist's report on all the consenting subjects with fertility challenges undergoing pelvic ultrasound investigations at the Obstetrics and Gynaecology Department of General Hospital Onitsha at the time of the study using convenience sampling method

Selection Criteria

The subject met the following criteria:

Inclusion criteria

1. Subjects must be 18 years and above.
2. Subjects were having fertility challenges.
3. The subject must be a resident of Onitsha.

Exclusion Criteria

1. Menopausal and postmenopausal women were not considered.

2. Patients without fertility challenges were not included.
3. Women who are not residents of Onitsha were not included.

Ethical consideration/informed consent
In accordance with the Helsinki Declaration, ethical approval was obtained from the Ministry of Health Department in Awka, Anambra State. Informed consent was obtained from each participant prior to enrollment in the study.

Instruments and procedures for data collection
A sonographic examination was used to assess the pelvis, with an emphasis on the uterus, to determine the presence of uterine fibroid masses. The data was collected based on patient age, number of fibroid masses, sizes, positions, and location of fibroids.

Equipment
Ultrasound scanning was conducted using a portable Kaixin KX 2000G ultrasound scanner with serial number 0911052 and a 3.5 MHz curvilinear transducer. The portable scanner was manufactured by Xuhou Kaixin Electronic Company Limited, Jiangsu, China, in October 2000 and was recalibrated by a maintenance engineer for quality assurance purposes to ensure optimal resolution and accuracy.

Scanning technique
A basic scanning protocol was adopted and replicated for each subject. The protocol was as described by Roger and Tom (2007). The subject comes in and is laid supine on the moveable examination couch. A clear coupling gel was spread on the lower abdomen, slightly above the symphsis pubis, to aid in the transmission of the sound waves. Each patient took a bottle of water about 40 minutes prior to the ultrasound scanning to ensure adequate urinary bladder distention so as to provide the desired acoustic window. The time gain compensation (TGC) of the ultrasound scanner was set such that the depth of each uterus as far as the posterior wall was well demonstrated. The uterus was examined with each subject in a supine position. Then the long-axis view was obtained by varying the obliquity of the transducer until the maximum length of the uterus was in view. This was followed by scanning the short axis of the uterus, starting from the fundus and sweeping through the cervix. More caudal angulations through the uterus demonstrated the fundus. The values were determined and recorded as generated by the machine when measuring (length L x width W) by scanning both in the longitudinal and transverse planes to obtain the maximum dimensions. The subject was scanned at intervals of 5 to 15 minutes.

Method of data analysis
The statistical package for social sciences (SPSS) version 24 (IBM Corp., Armuk, NY, USA, 2016) was used to analyse the data, and a $p < 0.05$ was interpreted as significant. The fibroid values were correlated with the subject's age. The various age ranges were also matched with the frequency table, mean, standard deviation, and variance.

RESULTS

Prevalence of uterine fibroids among fertility-challenged women
From table 1, out of 500 women, 36.4% (n = 182) had uterine fibroids, while the remaining 63.6% (n = 318) did not have uterine fibroids. There was a prevalence rate of 36.4%.

Distributions of fibroid according to the woman's age

In table 2, of the 182 women that had uterine fibroids, the majority 56.59% (n=103) were within the age group of 31–40 years, followed by the age group 20–30 years 23.63% (n=43) and the least 19.78% (n=36) were those within the age group of 41–50 years.

Distributions of fibroid based on sizes and numbers

From table 3, out of 182 women that had uterine fibroids, a total of 401 fibroids were identified and measured. Out of the 401 fibroids, the majority 46.63% (n= 187) have sizes of 61mm and above, followed by those measured 51-60mm 24.19% (n=97) and the least 2.74% (n= 11) have sizes of ≤ 20mm. Also, table 4.3 revealed that out of 182 women that had uterine fibroids, a greater number 45.6% (n=83) had multiple numbers of fibroid, and the least 24.18% (n=44) had double numbers of fibroid.

Distribution of fibroids based on their positions

From figure 1, out of 401 identified uterine fibroids, the highest number 46.13% (n= 185) was in the anterior position, followed by posterior position 37.16% (n=149) and the least 0.25% (n=1) was in the postero-fundal position.

Distribution of fibroids based on their locations

From figure 2, out of 401 identified fibroids, large proportion 68.58% (n=275) were located in the intramural, followed by those located in the submucosal 15.46% (n=62) and the least 1.49% (n=6) were located in the intra-cavity.

Correlation of fibroid size, number, position and locations with age

The results in table 4, revealed that there were no statistically significant correlations of age with fibroid size (r= 0.635, p = 0.09), number of fibroid(r= 0.341, p = 0.24), positions (r= 0.427, p = 0.07) and locations (r= 0.616, p= 0.18).

Table 1: Prevalence of Uterine Fibroid among Fertility-challenged Woman

S/N	Variables	Frequency (n)	Percentage (%)	Prevalence (%)
a	Presence of fibroids	182	36.4	
b	Absent of fibroid	318	63.6	
	Total	500	100	

Table 2: Frequency and Percentage distributions of the Fibroids according to the subject's age

S/N	Age groups (years)	Frequency (n)	Percentage (%)
A	20 – 30	43	23.63
B	31 – 40	103	56.59
C	41 – 50	36	19.78
	Total	**182**	**100**

Table 3: Frequency and Percentage distributions of the Fibroids based on the sizes and numbers

S/N	Variables	Frequency (n)	Percentage (%)
A	**Sizes (mm) ≤ 20**	11	2.74
	1 – 30	18	4.49
	31 – 40	25	6.25
	41 – 50	63	15.70
	51 – 60	97	24.19
	60 and above	187	46.63
	Total	**401**	**100**
B	**Numbers of fibroids**		
I	Single	55	30.22
Ii	Double	44	24.18
Iii	Multiples	83	45.6
	Total	**182**	**100**

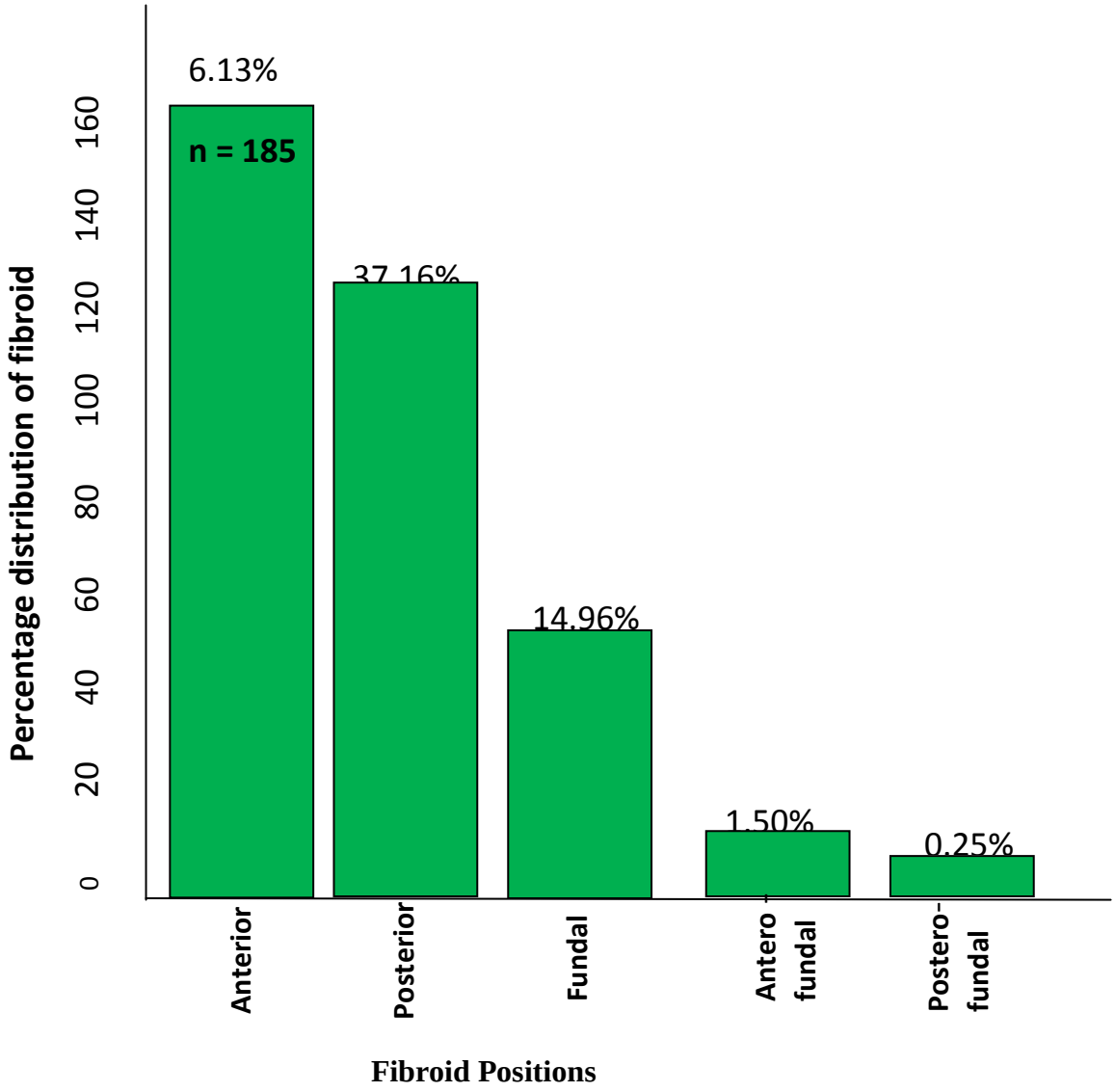

Figure 1. Distributions of fibroid based on their Positions

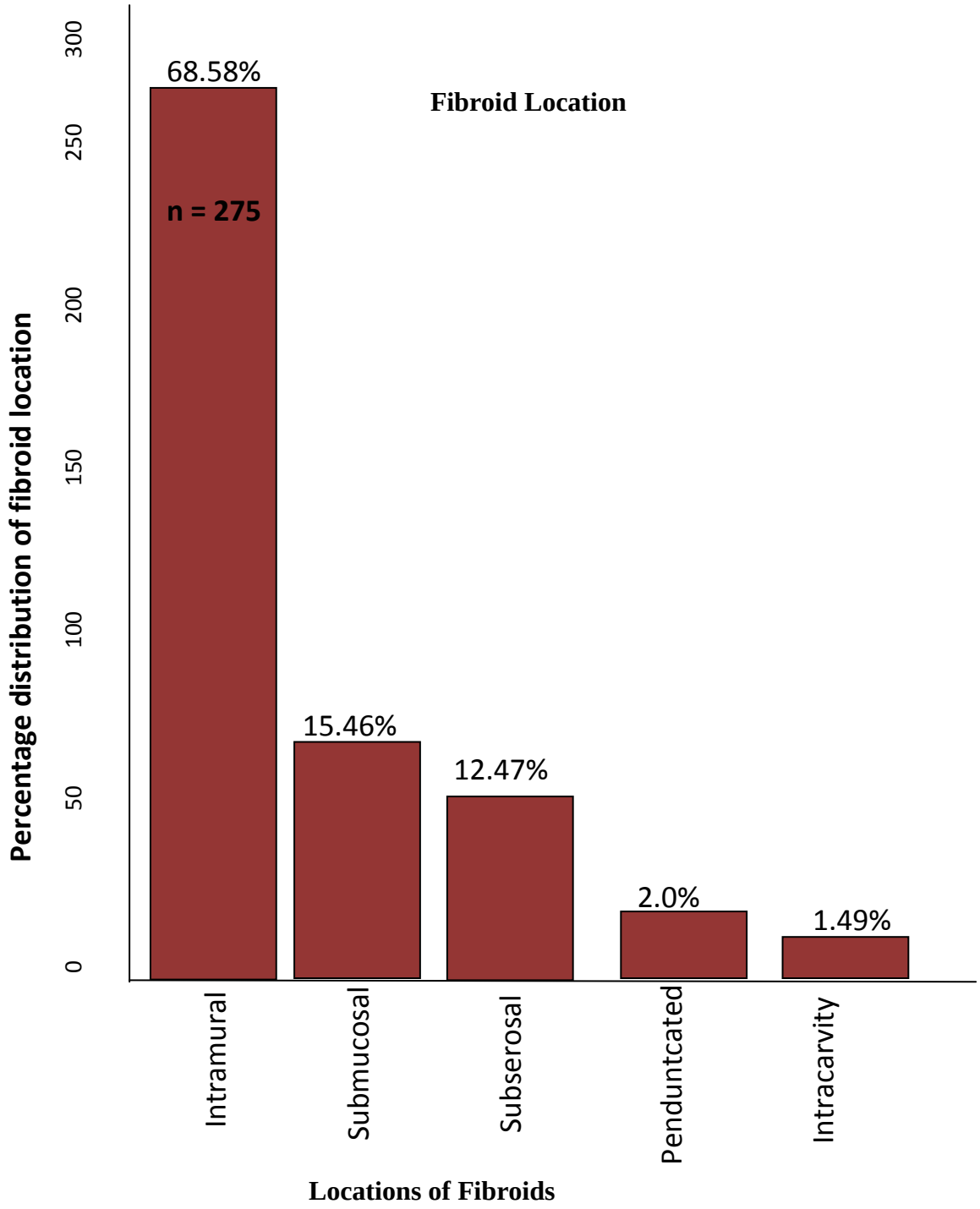

Figure 2 Distributions of the fibroids based on their locations

Table 4: Correlation of fibroid size, number position and locations with age

S/N	Variables	ɣ	P-Value	Remarks
a	Size	0.635	0.09	N/S
b	Number of fibroid	0.341	0.24	N/S
c	Positions	0.427	0.07	N/S
d	Locations	0.616	0.18	N/S

Key: N/S: Not Significant

DISCUSSIONS

There is a low prevalence rate of uterine fibroids among the study population, as only a few percent of the population have uterine fibroids. This finding is consistent with the findings of the studies conducted by Ukwenya *et al. (2015*) in South-West Nigeria. (Egbe *et al.,* 2018) in regional hospitals in Cameroon, Sarkodie *et al*. (2016) in Ghana, and Oluwolu *et al. (*2015). In Ukwenya *et al*.'s (2015) study, conducted in South-West Nigeria, fibroid prevalence was reported at 6.83% in asymptomatic subjects. (Egbe *et al.,* 2018) in their study, which was carried out in Cameroon, reported a prevalence rate of 16.8%. In a study conducted in Ghana, (Sarkodie et al., 2016) reported 36.9% uterine fibroid and (Oluwolu et al., 2015) reported 30.7%.

The results of the distribution of the fibroid according to age revealed that most of those that had fibroid were in the age group of 31–40 years. This result shows that young adults were commonly affected. This finding is in agreement with the findings of the studies conducted by Eric *et al. (2012*) in West Africa and Edzie *et al*. (2023) in South-Central Ghana, which also reported a high incidence of uterine fibroids among young female adults of the age of 30–40 years.

It was found in this study that most of the fibroids were larger in size, measured at 61mm and above. This result implies that fibroid cells developed in different sizes. The majority of the women had multiple fibroid lesions. This finding is in agreement with the finding of Olotu and Okon (2021). In the Olotu and Okon 2021 study, which was conducted in Port Harcourt, it was reported that out of 92 fibroid cases, 67% (n = 62) had multiple fibroids.

In this study, it was found that most of the fibroids were seen in the anterior wall of the uterus. This finding is consistent with the finding of the previous study carried out by Olotu and Okon (2021) in the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria, which documented that of 92 fibroid cases, 42.3% (n = 39) were found at the anterior wall.

The results on the anatomical locations of the fibroids revealed that most of the fibroids were located intramural. This finding is consistent with the findings of the previous research work done by Olotu and Okon (2021). The location of uterine fibroids is essential as far as unpleasant pregnancy results are concerned.

The correlation results in this study show that there were no statistically significant correlations between the subject's age and fibroid size, number, position, or location. This simply means that the subject's age does not influence the size, number, position, or location of the fibroid.

CONCLUSION

The prevalence of fibroid in the study population is low. The fibroids were found at various positions and anatomical locations, with the majority in the anterior wall and intramural, respectively. The age of the women did not have any significant impact on the number, size, position, or location of the fibroids.

Conflict of interest: None declared among the authors.

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