ISSN: 0975-1556

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2021; 13(4);480-488
Original Research Article

Sonographic Evaluation of Morphology of Pelvic Masses and to Correlate with the Histopathological Diagnosis of the Patients who Underwent Surgical Intervention

Sanjay Kumar Choudhary

Associate Professor, Department of Radiology, Netaji Subhas Medical College and Hospital, Amhara, Bihta, Patna, Bihar, India

Received: 06-06-2021 / Revised: 19-07-2021 / Accepted: 28-07-2021
Corresponding author: Dr. Sanjay Kumar Choudhary
Conflict of interest: Nil

Abstract

Aim: The aim of this study was to evaluate the sonographic morphology of pelvic masses and to correlate with the histopathological diagnosis of the patients who underwent surgical intervention.

Material and Methods: A cross-sectional prospective study was conducted in the Department of Radiology, Netaji Subhas Medical College and Hospital, Amhara, Bihta, Patna, Bihar, India for 12 months. Total 100 female patients with gynecological masses using high resolution ultrasonography and findings correlated with histopathology or serial sonographic examination.

Results: Majority of the patients were in the age group of 40-50 years with mean age of 36.3 years. The minimum number was in the age group of below 20 years. The most common chief complaint of female patients enrolled in our study was pain in pelvic cavity 36 (36%) followed by pain and palpable mass 16(16%). Menstrual irregularity, menorrhagia, post-menopausal bleeding, infertility, and amenorrhea were the other less common complaints in the female patients of our study. Out of 100 patients evaluated by ultrasonography 25 (25%) were having ovarian pathologies and 45(45%) were having uterine pathologies. 11(11%) patients presented with localized collection in to the fallopian tube pathologies. Few cases there were involvement 8(8%) of vagina. Fibroids were the most common uterine masses.

Conclusion: The USG is most commonly preferred imaging tool to evaluate gynecological masses. It's important to differentiate gynecological and non-gynecological masses on sonography for accurate management of the patient.

Keywords: Gynecological pelvic mass, uterus, ovary, adenexa, ultrasonography, Histopathological diagnosis

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0) and the Budapest Open Access Initiative (http://www.budapestopenaccessinitiative.org/read), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Clinicians are faced with dilemma of differentiating malignant tumors from benign masses in patients presenting with pelvic mass. When evaluating pelvic mass, gynaecologists first consider ovarian pathology, as ovarian pathology is responsible for 70% of pelvic masses found at exploratory surgery on patients with preoperative diagnosis of pelvic mass. Precise diagnosis is required to decide appropriate treatment in such patients. Benign masses can be treated

conservatively or by minimal invasive technique[1] whereas malignant masses should be referred to tertiary care centers for proper diagnosis and management. Ultrasound is noninvasive, easily available test used for differentiating benign from malignant pelvic masses. It is possible to suspect malignancy on basis of ultrasound and Colour Doppler findings, but definite diagnosis cannot be done based on ultrasound and Colour Doppler findings[2] Ultrasonography has many advantages over the other imaging modalities like conventional Xray, computed tomography, MRI and invasive procedures. Ultrasonography is a real time, noninvasive, safe, easy, quick tool, inexpensive, sensitive, scanning of patient involve no discomfort, results of scanning are apparent immediately on viewing screen and is a dynamic modality. Ultrasonography permits to distinguish correctly between a benign and a malignant adnexal mass and, within these groups of diseases, to give an accurate diagnosis in most of the cases. Nevertheless ultrasonography isn't free from errors and limitations. Diagnostic errors are probable in the identification of masses which appear solid at US. In these cases is difficult to evaluate the uterine or ovarian or the extra-gynaecologic origin of the lesion. These cases require CT or MRI scan. In particular MRI has proven to be useful in detecting and staging of gynaecological malignancies and in detecting the origin of extra-gynecological pelvic masses.[3] Pelvic ultrasonography to visualize the adnexa and the uterus is commonly performed in symptomatic and asymptomatic women of reproductive and menopausal age. Although pelvic ultrasound is highly sensitive in detecting adnexal masses, its specificity in detecting malignancy is lower. In addition, the differentiation between functional ovarian masses that will resolve over time and nonfunctional masses has tremendous implications for patients' counseling and management. Other types of adnexal cysts (such as endometrioma, mature cystic teratoma, and Para ovarian cysts) are also important to diagnose correctly since they may affect patients' fertility, may be associated with significant pelvic disease, or put the patient at risk for ovarian torsion. Thus, the correct use of pelvic ultrasonography has become an integral part of the gynecologic evaluation and exam[4,5]

The space occupying lesions in female pelvis are very common over a wide age range. Many pathological conditions give rise to pelvic mass. It is difficult to arrive at an accurate diagnosis on clinical examination alone. Trans-abdominal and Trans-vaginal ultrasonography are precisely helpful to determine the origin of a mass from uterus or ovarian or adnexal or extra genital structures. Information about the internal anatomy & physiology of the ovary or uterus is frequently obtained during ultrasonography that would not be evident even by direct visualization of the pelvic organs at laproscopy or laparotomy[6]

Serial sonography is done to detect changes in size and appearance of a particularly monitoring of a cyst that are functional in nature, for any progressive increase in size or changes in internal components. Serial sonography is also done for assessment of change in size following therapeutic response of pelvic malignancies and ovulation timing. The aim of this study was to evaluate the sonographic morphology of pelvic masses and to correlate with the histopathological diagnosis of the patients who underwent surgical intervention.

Material and Methods

A cross-sectional prospective study was conducted in Department of Radiology, Netaji Subhas Medical College and Hospital, Amhara, Bihta, Patna, Bihar, India for 12 months, after taking the approval of the protocol review committee and institutional ethics committee. 100 patients with complaints suggestive of a pelvic mass include in this study. The final diagnosis was correlated with histopathological diagnosis. The

cytohistopathology diagnosis was considered as the final diagnosis.

Inclusion criteria

Female patients of all age groups with clinical suspicion of pelvic mass or chronic pelvic pain and gave written consent

Exclusion criteria

Post-operative patients and non-gynecological female pelvic masses.

Methodology

The current methods of pelvic sonography in use are transabdominal real time scanning and transvaginal real time scanning, transabdominal scanning most often uterus and ovaries are visualized by using 3 MH transducer at a depth 10- 15 cm through urinary bladder whereas with transvaginal sonography the same structures are visualized at depth 1-8 cm and 5-7 MH transducers are used. In every case trans abdominal sonography was done and in some cases finding are correlated with Trans vaginal sonography. In almost every case proper sonographic evaluation of uterus, endometrium, both adenexa, ovaries, bladder and anterior pelvic structure, pelvic walls, cul de sac, rectum, small bowel and posterior pelvic structures was done. Sonographic findings of each lesion were designed to assess echogenicity, shape, borders, size, composition, calcifications, septation, locularity, laterality, presence of invasion of capsule and fixation of mass. The presence or absence of ascites or other metastatic lesions were also noted in every case. Echogenicity categories included markedly hypoechoic, isoechoic, hyperechoic and anechoic. Size was defined as the maximal dimensions of the lesion. Composition was defined as solid, cystic and mixed. Borders were defined as smooth and irregular. Calcifications were divided into those located centrally within the nodule, peripherally, and none. Posterior shadowing of at least one of the suspected calcifications was required to consider the finding present. The detailed clinical history was taken and general and local pelvic examination was performed for all patients with various palpable pelvic masses on bimanual pelvic examination.

Pathological evaluation was performed on all the lesions.

Results

USG scan was performed in 100 female patients who presented with history, symptoms, and signs of the pelvic mass. Majority of the patients were in the age group of 40-50 years with mean age of 36.3 years. The minimum number was in the age group of below 20 years (Table 1)

Table 1: Age wise incidence among study participants n=100

Age group (years)	Number of cases (%)
Below 20	2 (2)
20-30	8 (8)
30-40	25 (25)
40-50	53 (53)
50-60	9(9)
Above 60	3(3)
Total	100

Table 2: Percentage of pre- and post-menopausal patient among study participants n=100

Patients	Number of cases (%)
Premenopausal	72 (72)
Post-menopausal	28 (28)

Table 3: Percentage of patients with different chief presenting complaints n=100

Symptoms	Number of cases (%)
Pain in pelvic cavity	36 (36)
Pain and palpable mass	16 (16)
Pain and bleeding PV	10 (10)
Menorrhagia and menstrual irregularity	14(14)
Post-menopausal bleeding	9 (9)
Primary amenorrhea	7 (7)
Infertility	8 (8)
Total	100

The most common chief complaint of female patients enrolled in our study was pain in pelvic cavity 36 (36%) followed by pain and palpable mass 16 (16%). Menstrual irregularity, menorrhagia, post-menopausal bleeding, infertility, and amenorrhea were the other less common complaints in the female patients of our study Table 3.

Table 4: Different types of cases among study participants

Types of cases	Number of cases (%)
Ovarian/adnexal masses	25 (25)
Uterine masses	45 (45)
Fallopian tube pathologies	22 (22)
Vaginal pathologies	8 (8)
Total	100(100)

Out of 100 patients evaluated by ultrasonography 25 (25%) were having ovarian pathologies and 45 (45%) were having uterine pathologies. 11(11%) patients presented with localized collection in to the fallopian tube pathologies. Few cases there were involvement 8 (8%) of vagina [Table 4]. In our study, the most common female gynecological masses were that of uterine, followed by ovary/adnexa, fallopian tubes and vagina. Fibroids were the most common uterine masses in our study accounting for nearly 45%, i.e., 45 cases of total 100 cases of uterine masses and uterine fibroids also constituted 42 (42%) of total 100 cases in our cross-sectional study of female gynecological masses evaluation. Thus, uterine fibroid is one of the most important and common cause of female gynecological pelvic masses [Table 5]

Majority of ovarian lesions were benign cystic lesion 40 (40%) in which tubo-ovarian masses 11(11%) and follicular cyst were most common 8 (8%), followed by luteal cyst, serous cystadenoma, mucinous cystadenoma. Malignant ovarian masses found in 11% (11/100 of patients), in which serous cystadenocarcinoma most common found in 63.63% (7/11 of malignant ovarian masses) followed by mucious cystadenocrcinoma and endometrial sinus tumor (18.18% each) Table 5.

In the identification of the uterine pathology, 90.48% (38/42) of fibroid, 75% (3/4) of fibroids were diagnosed as adenomyosis correctly by ultrasonography after post surgical histopathological examination. Accuracy of ultrasonography in the diagnosis of uterine and cervical malignancies was 100% in the presenting study [Table 5].

15 patients were diagnosed as tubo-ovarian masses out of which 11 were proved correctly by histopathology (73.33%). 4

case was diagnosed false positive and proved as hydrosalphinx after postsurgical histopathology. So accuracy of diagnoses of malignant ovarian masses and tubo-ovarian masses were found 100% and 73.33% respectively, in presenting study [Table 5].

Table 5: Percentage wise distribution of pelvic masses and their histopathological diagnosis N=100

Types of Lesions	USG Diagnosis	Histopathological Diagnosis
UTERINE		
Fibroid	42	38
Fibroid with pregnancy	1	1
Adenomyosis	3	4
Adenocarcinoma of uterus	2	2
Carcinoma of cervix	1	1
OVARIAN		
Benign		
Follicular cyst	8	8
Luteal cyst	4	4
Serous cystadenoma	5	5
Mucinous cystadenoma	5	5
Benign cyst teratoma	3	4
Hydrosalpinx	00	3
Ovarian cyst torsion	00	3
Tubo-ovarian masses	15	11
Malignant Lesion		
Serous cystadenocarcinoma	7	7
Mucinous cystadenocarcinoma	2	2
Endometrial sinus tumor	2	2
TOTAL	100	100

On histopathological examination, the most common finding was leiomyoma 38 (38%) followed by tubo-ovarian masses 11 (11%). Study also had 2 cases of adenocarcinoma of uterus and 1 case of carcinoma of cervix. Serous cyst adeno carcinoma was the most common ovarian malignancy 7 (7%). There was 2 case of endometrial sinus tumor (Table 5). 2 cases diagnosed as fibroid on USG were found to be adenomyosis on HPE. 11 cases of ovarian malignancy were reported on USG, however 11 cases were confirmed to be malignant on HPE (Table 5)

Discussion

The present study was undertaken to evaluate the role of ultrasound in determining site, size, nature and consistency of pelvic masses and to evaluate the results of conservative management by serial sonographic examination. 100 cases were studied sonographically and histopathologal confirmation of the diagnosis was obtained. The evaluation of pelvic masses assumes importance due to the fear and anxiety driven by the potential of missing a malignancy. This study focussed on the clinicopathological spectrum of gynecological pelvic masses - both uterine and adnexal. A major problem in diagnostic clarification of incidental findings on ultrasound is the characterization of the malignant potential of the lesions. Ovarian cancer, being a heterogeneous disease, is

composed of different types of tumors derived from different cell lines with different behaviours and clinical-pathological characteristics.[7] Several scoring systems based on ultrasound morphology of adnexal cysts have been proposed to differentiate benign lesions from malignant adnexal masses.[8,12]

These scoring systems are based on specific parameters such as surface, thickness of the wall, and cyst echogenicity, cyst volume, presence, thickness and number of septa, presence, size and number of vegetation, and presence and size of solid areas within the cyst. A false diagnosis of fibroid in two cases was corrected as adenomyosis after postsurgical biopsy. Walsh et al described characteristics features of adenomyosis but these cases of our study only showing enlargement of uterus with normal endometrial and myometrial echotexture and without any definite mass.[13] The common sonographic findings of adenomyosis in our study were globular uterine enlargement, cystic anechoic spaces in the myometrium, uterine wall thickening, heterogeneous echotexture and thickening of the transition zone[14].Adenomyoma usually has indistinct margin form adjacent myometrium unlike leiomyoma or fibroid which show distinct well-defined margin.[15] According to Bezjian et al. Leiomyma are one of the most common pelvic masses countered during pregnancy[16] In our study of female gynecological masses, we included 2 cases of carcinoma. Only 1 case of carcinoma cervix in our study underwent cervical biopsy and histopathological evaluation. The case in our study was squamous cell carcinoma on histopathological examination. We included 2 cases of histopathologically proven carcinoma endometrium diagnosed on USG as dysplastic endometrial thickening and mass.[17] In 5 cases of endometrial carcinoma, TVS did revealed abnormal prominent endometrial echo, growth in the endometrial cavity which had to be confirmed by HPE. TVS with its better resolution can differentiate between a benign ovarian or adnexal mass and a complex mass. Lesions with echogenic solid areas, irregular walls, thick septations, mural nodule, papillary excrescences, bilaterality and ascites along with evidence of neoangiogenesis on colour doppler are features suggestive of a possible malignancy.[18] Adenocarcinoma of uterus was diagnosed in 2 cases in our study, in which uterus was normal in size, it showed bulbar type of configuration of uterus with hypoechoic pattern and endometrial echo was prominent. Postsurgical histopathology confirmed the diagnosis as adenocarcinoma stage II. In the identification of the uterine pathology, 90.48% (38/42) of fibroid, 75% (3/4) of fibroids were diagnosed as adenomyosis correctly by ultrasonography after post-surgical histopathological examination. Accuracy of ultrasonography in the diagnosis of uterine and cervical malignancies was 100% in the presenting study

All ovarian cystadenoma were anechoic with well-defined walls. Fleischer et al found septation in all of their 18 cases of serous cystadenomas. Mucinous cystadenoma may in addition contain low level echoes due to their mucin content. This finding was observed in our case. Similarly Walsh, Taylor et al.[19] also found week internal echoes occasionally in cases of mucinous cystadenomas. Hence it suggests that a cystic ovarian mass with septation and internal echoes is more likely to be a mucinous cystadenoma. 11 cases of ovarian malignancy were reported on USG, however 11 cases were confirmed to be malignant on HPE .In presenting study, all malignant ovarian tumors were showing cystic mass with ill-defined walls and solid component. All cases present with ascites. Out water EK et al[20] suggested that irregular and solid component in a cystic mass suggested gross malignant changes. None of the malignant ovarian tumor was purely cystic.

In the tubo-ovarian masses two types of patterns were seen, the first consisting of

large fusiform shaped cystic masses representing fallopian tubes and second type was that of a rounded or ovoid mass with ill-defined walls. Well defined cystic tubo-ovarian masses were indistinguishable from other types of ovarian cysts, however clinical history and tenderness on physical examination helped in differential diagnosis. Ultrasound was especially helpful in cases treated conservatively since it gauged the results of treatment by serial sonographic examination. 3 case of ovarian cyst postoperatively diagnosed as torsion of cyst. Ultrasonographically cyst was anechoic and very large in size.

In various ovarian pathologies, benign cystic ovarian lesions were detected with 100% accuracy with USG. Ovarian malignancies were diagnosed in 11 patients USG, out of which 11 diagnoses were proved correct (100%). 15 patients were diagnosed as tubo-ovarian masses out of which 11 were proved correctly by histopathology (73.33%). 4 case was diagnosed false positive and proved as hydrosalphinx after post-surgical histopathology. So accuracy of diagnoses of malignant ovarian masses and tubo-ovarian masses were found 100% and 73.33% respectively, in presenting study. The low specificity of ultrasound is due to the overlap in the sonographic characteristics of benign pelvic masses like endometriomas, pedunculated leiomyomas, borderline tumours and ovarian malignancies. Serial monitoring was helpful in these cases, which shows resolution of the lesion on subsequent sonographic examination. Luteal cyst appeared as an anechoic mass with well-defined walls. In our study we were found

8 follicular and 4 luteal cyst, which was consistent with the findings of Fleischer et al.[21] Ovarian cysts are relatively common finding on ultrasound, especially in postmenopausal women, with an estimated incidence of up to 21% in this population[2]

Our findings were consistent with study of Lawson et al.[22] Fleischer et al.[21] and Walsh et al.[19] reported accuracy of 91%, 91% and 94% respectively. In the present study, fibroids were the most common uterine masses in our study accounting for nearly 42%, i.e. Thus, uterine fibroid is one of the most important and common cause of female gynecological pelvic masses. USG, both transabdominal and transvaginal have a well-established role in the initial evaluation of a pelvic mass. USG has many advantages being easily available, relatively inexpensive and nonionising. Leiomyomas are easily diagnosed on USG . In study by Shobha S. Pillai[23] 38 cases of leiomyomas were diagnosed preoperatively by physical examination and USG and 44 cases were confirmed by histopathological examination (HPE), showing a sensitivity of 95.5% and specificity of 61.4%.[23] Study by Eze JC et al. showed sensitivity of transvaginal scan (TVS) for diagnosis of uterine leiomyomas to be 94.5%, and specificity of 62.5%[24] Accuracy of ultrasonography in the diagnosis of uterine and cervical malignancies was 100% in the presenting study.

Due to the low likelihood of ovarian cancer in incidental findings of adnexal pelvic masses, and because of the high rates of spontaneous resolution, ultrasound monitoring can be performed with good early diagnosis rates for borderline and type I tumors. The frequency of these revaluations should be established individually and according to the routine of each service. However, early screening of type II tumors remains a challenge. Pelvic masses that are overlooked on physical examination will be identified by Ultrasonographic examination. Conversely the identification of small myomas, ovarian enlargement and physiological cysts may lead to increased patient concern and even operations that might be unnecessary. However the drawbacks of sonography include technical limitation caused by patient habitues, operator dependence and

techniques inability to provide specific characterization

The combined analysis of morphological parameters on ultrasound and Doppler study, CA-125 levels, and the assessment of a symptom index composed of abdominal bloating and/or increased abdominal size, pelvic and/or abdominal pain, and inability to eat normally and/or rapid feeling of fullness may increase diagnostic rates. Even with all the current technology and knowledge on the subject, it is not clinically possible to fully differentiate benign and malignant lesions preoperatively. Thus, pathological analysis remains the gold standard for definitive diagnosis.[25,26]

Conclusion

USG is most commonly preferred imaging tool to evaluate gynecological masses. It's important to differentiate gynecological and non-gynecological masses on sonography for accurate management of the patient.

References

1. Granberg S, Crona N, Enk L. Ultrasound guided puncture of cystic tumors in the lower pelvis of young women. J Clin Ultrasound. 1989;17(2):107−111.
2. Requard CK, Mettler FA, Wicks JD. Preoperative sonography of malignant ovarian neoplasms. Radiology. 1981;137(1):79−82.
3. Johnson RS. Radiology in the management of the ovarian cancer. Clin Radiol 1993; 48:75-82.
4. Patel MD. Pitfalls in the sonographic evaluation of adnexal masses. Ultrasound Q. 2012; 28:29–40.
5. Smorgick N, Maymon R. Assessment of adnexal masses using ultrasound: a practical review. International Journal of Women's Health. 2014; 6:857-863.
6. Liu J, Xu Y, Wang J. Ultrasonography, computed tomography and magnetic resonance imaging for diagnosis of ovarian carcinoma. Eur J Radiol 2007; 62:328-334.
7. Kurman RJ, Shih Ie M. The origin and pathogenesis of epithelial ovarian cancer: a proposed unifying theory. Am J Surg Pathol. 2010; 34(3):433-43.
8. Finkler NJ, Benacerraf B, Lavin PT, Wojciechowski C, Knapp RC. Comparison of serum CA 125, clinical impression, and ultrasound in the preoperative evaluation of ovarian masses. Obstet Gynecol. 1988; 72(4):659-64.
9. Jacobs I, Oram D, Fairbanks J, Turner J, Frost C, Grudzinskas JG. A risk of malignancy index incorporating CA 125, ultrasound and menopausal status for the accurate preoperative diagnosis of ovarian cancer. Br J Obstet Gynaecol. 1990; 97(10):922-9.
10. Sassone AM, Timor-Tritsch IE, Artner A, Westhoff C, Warren WB. Transvaginal sonographic characterization of ovarian disease: evaluation of a new scoring system to predict ovarian malignancy. Obstet Gynecol. 1991; 78(1):70-6.
11. DePriest PD, Shenson D, Fried A, Hunter JE, Andrews SJ, Gallion HH, Pavlik EJ, Kryscio RJ, Van Nagell JR. A morphology index based on sonographic findings in ovarian cancer. Gynecologic oncology. 1993 Oct 1;51(1):7-11.
12. Lerner JP, Timor-Tritsch IE, Federman A, Abramovich G. Transvaginal ultrasonographic characterization of ovarian masses with an improved, weighted scoring system. Am J Obstet Gynecol. 1994; 170(1 Pt 1):81-5
13. Walsh JW, Taylor KJ, Wasson JF, Schwartz PE, Rosenfield AT. Gray-scale ultrasound in 204 proved gynecologic masses: accuracy and specific diagnostic criteria. Radiology. 1979 Feb;130(2):391-7.
14. Sakhel K, Abuhamad A. Sonography of adenomyosis. J Ultrasound Med 2012;31:805-8
15. Bergeron C, Amant F, Ferenczy A. Pathology and physiopathology of adenomyosis. Best Pract Res Clin

Obstet Gynaecol. 2006 Aug;20(4):511-21. Epub 2006 Mar 24.
16. Bezian A, Carretero M: ultrasonic evaluation pelvic masses in pregnancy. Clin. Obstet. Gynae. 1977; 20; 325-38.
17. Epstein E, Di Legge A, Måsbäck A, Lindqvist PG, Kannisto P, Testa AC. Sonographic characteristics of squamous cell cancer and adenocarcinoma of the uterine cervix. Ultrasound Obstet Gynecol 2010; 36:512-6.
18. Kinkel K, Hricak H, Lu Y. US characterization of ovarian masses: a meta-analysis. Radiol. 2000;217:803.
19. Walsh JW, Taylor KJ, Wasson JF, Schwartz PE, Rosenfield AT. Gray-scale ultrasound in 204 proved gynecologic masses: accuracy and specific diagnostic criteria. Radiology. 1979 Feb;130(2):391-7.
20. Outwater EK, Siegelman ES, Hunt JL. Ovarian teratomas: tumor types and imaging characteristics. Radiographics. 2001 Mar;21(2):475-90.
21. Fleischer AC. Differential diagnosis of pelvic masses by gray scale sonography. Am. Jr. of Roentology.1978; 131:469-76.
22. Lawson TL. Ectopic pregnancy: criteria and accuracy of ultrasonic diagnosis. American Journal of Roentgenology. 1978 Jul 1;131(1):153-6.
23. Pillai SS. Clinicopathological spectrum of gynecological pelvic masses: a crosssectional study. Int J Reprod Contracept Obstet Gynecol 2017;6:1915-9.
24. Eze JC, Ugwu AC, Ohagwu CC. The value of ultrasonography in the diagnosis of leiomyomas in Southeast Nigeria. J Asian Scient Res. 2013;3(2):151-6.
25. Dias DS, Bueloni-Dias FN, Delmanto A, Tonon ÂF, Tayfour NM, Traiman P, Dias R. Clinical management of incidental findings on pelvic adnexal masses. Revista da Associação Médica Brasileira. 2015 Oct;61(5):469-73.
26. Tripathi P, Singh D, Bagul M. Ultrasonography Study of Gynecological Pelvic Masses. Int Res J Cli Med 2016;1(4):1-6.