

## A Study of Clinical Spectrum of Fibroid Uterus in Patients Attending Tertiary Care Hospital

Disha Jain<sup>1</sup>, Vrunda Chaudhary<sup>2</sup><sup>1</sup>Senior Resident, Kurla Bhabha Hospital, Kurla, Mumbai, Maharashtra, India<sup>2</sup>Professor, Department of Obstetrics and Gynaecology, Ashwini Rural Medical College, Hospital Research Centre, Solapur, Maharashtra, India

Received: 25-11-2023 / Revised: 23-12-2023 / Accepted: 26-01-2024

Corresponding Author: Dr. Disha Jain

Conflict of interest: Nil

### Abstract:

**Background:** Cervical leiomyoma forms the most common type of malignant tumor in the uterus, as well as pelvic tumor most common in women. It occurs in one in four or five women of childbearing age. Fibroid is an estrogen-dependent tumor. It is believed that symptomatology depends on the number, size and location of the tumor, although most leiomyomas are believed to be undetectable and progressively slow so present was carried out to study clinical spectrum of fibroid uterus in patients attending tertiary care hospital and the pathological changes in endometrium and cervix in patients having fibroid uterus.

**Material and Methods:** Present study was single-center, prospective Cross-sectional study, conducted in patients attending OPD of Department of Obstetrics & Gynecology of tertiary care centre during study period September 2019-August 2021. Patients with USG confirmed uterine fibroid and fulfilling the inclusion criteria.

**Results:** In present study majority of study subjects were from age group 36-45 years contributing 25 (62.5%) followed by >45 years 12(30%). Mean age of study participants was 42.5 years. Intramural fibroids were the most common type of fibroid among study subjects contributing 21 (52.5%) followed by Subserosal 09(22.5%), Submucosal 08(20%) and Cervical fibroid contributed 02 (5%) respectively. Adenomyosis contributing 14 (35%) followed by Chronic cervicitis and Polyps in 07 cases (17.5%). Most common endometrial pattern among cases of fibroid was proliferative contributing 23 (57.5%) followed by Secretary 6 (15%), Hyperplastic 05 (12.5%).

**Conclusion:** The high prevalence of anaemia in fibroid cases. Increased urinary frequency, lower pelvic pain and dysuria were most common presenting complaints. Intramural fibroids were the most common type of fibroid among study subjects. Most of the cases were treated with total abdominal hysterectomy with bilateral salpingoophorectomy. Proliferative pattern was most common endometrial pattern after histopathological examination and hyaline degeneration was seen in most the cases with degenerative changes in current study.

**Keywords:** Fibroid, Hysterectomy, Intramural fibroids, Proliferative pattern.

This is an Open Access article that uses a funding 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

Cervical leiomyoma forms the most common type of malignant tumor in the uterus, as well as pelvic tumor most common in women [1]. It occurs in one in four or five women of childbearing age. Fibroid is an estrogen-dependent tumor. It is believed that symptomatology depends on the number, size and location of the tumor, although most leiomyomas are believed to be undetectable and progressively slow [2].

Because of the prevalence of clinical symptoms such as menstrual irregularities, pelvic pain, infertility represents a significant public health burden on women and economic costs in society. They take importance especially in our country as they are an important cause of anemia. Therefore, strategies are needed to prevent formation, reduce

growth and treatment without surgery [3]. Surgery has long been a major treatment for myomas. For postmenopausal women, hysterectomy creates an attractive option as it eliminates both symptoms and the chances of recurrence [4]. For women who wish to keep the uterus for future pregnancy or for other reasons a well-known myomectomy.

The most common trend has been, in non-surgical methods such as GnRH hormone analogues / agonists, RU 486,22 or elective artery uterine embolization, laparoscopic cryoablation, radiofrequency thermal ablation, magnetic resonance guided ultrasound [5,6]. Despite the great public health impact of leiomyoma, little is known about its cause. There are suggestions in the literature on the similarities between smooth

muscle tissue and atherosclerotic plaque. Both cases are monoclonal origin. Insulin-resistant hyperinsulinemia is associated with the control of serum insulin as a growth factor -1 and epidermal growth factor levels, and these agents can influence the development of uterine leiomyomas by enhancing ovarian hormone release or directly promoting smooth muscle growth. –myometrial [7,8]

Hypertension represents a 'proatherogenic' condition that increases the risk of fibroid development and / or cytokine release and thus increases the risk of developing or developing uterine fibroids, by a process similar to atherosclerosis [9].

#### Aim and Objective:

**Aim:** A study of clinical spectrum of fibroid uterus in patients attending tertiary care hospital.

#### Primary Objective:

To study the clinical spectrum of patients having uterine fibroid

#### Other Objective:

1. To study the pathological changes in endometrium and cervix in patients having fibroid uterus.
2. To study the associated morbid condition with fibroid.

#### Material and Methods

**Study Design:** Cross sectional hospital based study.

**Study Setting:** Tertiary care hospital.

**Study Population:** ALL patients attending OBGY OPD of tertiary care centre during study period.

**Study Subjects:** Patients with USG confirmed uterine fibroid and fulfilling the inclusion criteria.

**Study Period:** 2 years (September 2019-August 2021)

**Sample Size:** With reference to study by Shrilatha J (2017) [10] , prevalence of fibroid in semiurban area was 11.6 %.

**Formula for Sample Size:**  $N = [Z(1-\alpha/2)]^2 \times P \times Q / L^2$

Where  $[Z(1-\alpha/2)]=1.96$

P=Prevalence of Fibroid

Q=100-P

L=Allowable error (Taken as 10% of absolute error )

$N = (1.96)^2 \times 11.6 \times 88.4 / 100$

$N = 3939.33 / 100$

$N = 39.39 = 40$

#### Inclusion Criteria

1. All patients giving consent.
2. All age group patients with USG confirmed fibroid.

#### Exclusion Criteria

1. Patient refusal.
2. Fibroid in pregnancy.
3. Fibroid with any malignancy.

**Ethical clearance:** Ethical clearance was obtained from institutional ethics committee.

**Research methodology specified for data collection:** After approval from institutional ethical committee study was conducted. All patients attending to gynaecology opd of Tertiary Rural Health Care Centre, fulfilling inclusion criteria were explained about study procedure. Informed written consent was taken after explaining the details. Predesigned and pretested study proforma was used as tool for data collection. Patient was interviewed, examined and was subjected to laboratory investigations.

A detailed history, clinical examination and investigations were made.

**Statistical Analysis:** Data was entered in Excel sheet and analyzed using SSPS software version 21. Percentages and other descriptive statistics were estimated. Chi square test was used to study associations.  $P < 0.05$  was considered as significant.

#### Result and Observations:

**Table 1 : Distribution of study participants according to Demographic Profile (N=40)**

	Age (In years )	Frequency [n=40]	percentage
Age-Group	25-35	03	7.5
	36-45	25	62.5
	>45	12	30.0
Education	Illiterate	3	7.5
	Primary	4	10.0
	Secondary	7	17.5
	Higher*	26	65.0
Occupation	Homemaker	21	52.5
	Employed	09	22.5

	Laborer	08	20.0
	Shop keeper	02	5.0
socioeconomic status	Class I	04	10.0
	Class II	08	20.0
	Class III	15	37.5
	Class IV	10	25.0
	Class V	03	7.5
parity	Nulliparous	05	12.5
	1 <sup>st</sup> para	02	5.0
	2 <sup>nd</sup> para	21	52.5
	3 <sup>rd</sup> para	11	27.5
	4 <sup>th</sup> Para	01	2.5
Obesity (BMI- Kg/m <sup>2</sup> )	>25 Kg/m <sup>2</sup>	21	52.5
	<25 Kg/m <sup>2</sup>	19	47.5

Majority of study subjects were from age group 36-45 yrs contributing 25 (62.5%) followed by >45 yrs 12(30%) and 03 (7.5%) were from 25-25 yrs respectively. Mean age of study participants was 42.5 majority of study subjects were educated upto more than 10<sup>th</sup> std contributing 26 (65%) followed by secondary 7 (17.5%), Primary 4 (10%) and 3 (7.5%) were illiterate. Maximum of study participants were homemakers contributing 21

(52.5%) followed by employed 09 (22.5%) , Laborers 08 (20%) and 02 (5%) were shop keeper respectively. Most of the subjects were from Lower socioeconomic classes (III,IV,V) contributing 28 cases (70%) and 12 (30%) were from upper classes (I,II). Most of study participants were 2<sup>nd</sup> para contributing 21 (52.5%) followed by 3<sup>rd</sup> para 11 (27.5%), 1<sup>st</sup> para 02 (5%), 1 (2.5%) was 4<sup>th</sup> Para and 05 (12.5%) were Nulliparous respectively.

**Table 2: Distribution of study subjects asper associated medical conditions, Menstrual symptoms, urinary signs/ symptoms**

		Frequency	Percentage
Obesity(BMI- Kg/m <sup>2</sup> )	Obese (>25 Kg/m <sup>2</sup> )	21	52.5
	Non-Obese (<25 Kg/m <sup>2</sup> )	19	47.5
Anaemia	Present	27	67.5
	Absent	13	32.5
Medical condition	Hypertension	06	15.0
	HTN with DM	02	5.0
	DM	01	2.5
	Hypothyroidism	03	7.5
	No comorbidity	28	70.0
Menstrual symptoms	Menorrhagia	19	47.5
	Dysmenorrhoea	13	32.5
	Polymenorrhagia	10	25.0
	Polymenorrhoea	05	12.5
	Metrorrhagia	05	12.5
	PUB	06	15.0
Menopause status	Premenopausal	28	70.0
	Postmenopausal	12	30.0
urinary signs/ symptoms	Increased urinary frequency	16	40.0
	Urinary retention	13	32.5
	Dysuria	15	37.5
Pain symptom	Lower pelvic pain	17	42.5
	Backache	09	22.5
	Lower limb pain	03	7.5

Majority of study participants were obese (BMI >25 Kg/m<sup>2</sup>) contributing 21 (52.5%) and 19 were normal 19(47.5%). Anaemia was present in most of the study subjects contributing 27 (67.5%). Above table shows that, medical conditions like hypertension 6 (15%), HTN with DM 02 (5%)

,Hypothyroidism 03 (7.5%) and DM in 1 case (2.5%) were present in study subjects. Menorrhagia was the most common menstrual problem among study subjects contributing 19 (47.5%) followed by Dysmenorrhoea 13(32.5%), Polymenorrhagia 10(25%), PUB 06 (15%), Metrorrhagia and

Polymenorrhoea 05 cases (12.5%) each respectively. Majority of study subjects were premenopausal contributing 28 (70%) and 12 (30%) had attained menopause. Increased urinary frequency was seen in majority of subjects contributing 16 cases (40%)

followed by Dysuria in 15 (37.5%) and Urinary retention in 13 cases (32.5%) respectively. Lower pelvic pain was most common pain symptom contributing 17 cases (42.5%) followed by Backache 09(22.5%) and Lower limb pain in 03 cases (7.5%) respectively.

**Table 3 : Distribution of study subjects according to size of uterus (in weeks )**

		Frequency	Percentage
Size of uterus (In weeks )	10 -14 weeks	24	60.0
	16-18 weeks	13	32.5
	>20 weeks	03	7.5
Type of fibroid	Intramural	21	52.5
	Subserosal	09	22.5
	Submucosal	08	20.0
	Cervical	02	5.0
Associated pathological conditions	Adenomyosis	14	35.0
	Chronic cervicitis	07	17.5
	Poplys	07	17.5
	Endometriosis	04	10.0
	Cystic ovaries	05	12.5
	PID	03	7.5

Above table shows that,uterine size in majority of subjects was 10-14 weeks contributing 24 cases (60%) followed by 16-18 weeks in 13 (32.5%) and >20 weeks 03 (7.5%) respectively.

Intramural fibroids were the most common type of fibroid among study subjects contributing 21 (52.5%) followed by Subserosal 09(22.5%), Submucosal 08(20%) and Cervical fibroid

contributed 02 (5%) respectively. Adenomyosis was the most common associated pathological condition among study subjects was Adenomyosis contributing 14 (35%) followed by Chronic cervicitis and Poplys in 07 cases (17.5%), Cystic ovaries 05 (12.5%), Endometriosis 4 (10%) and Pelvic inflammatory disease in 3 (7.5%) respectively.

**Table 4: Management of fibroid among study subjects**

Management of fibroid	Frequency	Percentage
TAH with BSO	27	67.5
Myomectomy	08	20.0
TAH	03	7.5
Vaginal hysterectomy	02	5.0
Total	40	100

**TAH with BSO: Total abdominal hysterectomy with bilateral salpingoopherectomy:** Above table shows that,Total abdominal hysterectomy with bilateral salpingoopherectomy was most common managment among cases of fibroid contributing 27(67.5%), followed by Myomectomy 08 (20%), TAH 03 (7.5%) and Vaginal hysterectomy 02 (5%) respectively.

**Table 5 : Endometrial pattern & Degenerative change among study participants**

		Frequency	Percentage
Endometrial pattern	Proliferative	23	57.5
	Secretary	06	15.0
	Hyperplastic	05	12.5
	Atrophic	04	10.0
	Cystic Glandular hypertrophy	02	5.0
Degenerative change	Hyaline	04	10.0
	Cystic	03	7.5
	Fatty	02	5.0
	Calcareous	02	5.0

Most common endometrial pattern among cases of fibroid was proliferative contributing 23 (57.5%) followed by Secretary 6 (15%), Hyperplastic 05 (12.5%), Atrophic 04 (10%) and Cystic Glandular hypertrophy 02 (5%)

respectively Hyaline deneneration was seen in 4 cases (10%) followed by Cystic 03 (7.5%), Fatty and Calcareous deneneration in 02 cases (5%) each.

**Table 6 :Association between demographic profile , Mensrtual Problem and type of fibroid among study subjects**

		Type of fibroid				Total	p-value
		Intramural [n=21]		Others* [n=19]			
		N	%	N	%		
Age (Years)	<45	15	53.57	13	46.43	28	P=0.835
	≥45	6	50.0	6	50.0	12	NS
Education	>10 th std	11	42.30	15	57.70	26	P=0.078
	<10 std and Illiterate	10	71.42	04	28.58	14	NS
Occupation	Homemaker	09	42.85	12	57.15	21	P=0.199
	Employed	07	77.77	02	22.23	09	NS
	Labourer	03	37.5	05	62.5	08	
	Shopkeeper	02	100	00	00	02	
socioeconomic status	Upper Class	8	66.66	4	33.34	12	P=0.240
	Lower Class	13	46.43	15	53.57	28	NS
Mensrtual Problem	Menorrhagia	8	66.66	4	33.34	12	P=0.199
	Others Problems *	13	46.43	15	53.57	28	NS
Menopause status	Premenopusal	15	53.57	13	46.43	28	P=0.835
	Postmenopausal	6	50.0	6	50	12	NS

Others\*: Submucosal,Subserosal and cervical

There were no statistical significant association was seen between age, Education, Occupation, socioeconomic status, Mensrtual Problem & and type of fibroid among study subjects.

### Discussion

This hospital based cross sectional study was conducted in OBGY department of tertiary care hospital in rural area among 40 cases of uterine fibroids with aim to study clinical spectrum of patients with fibroid.

In present Mean age of study participants in current study was  $42.4 \pm 1.562$ . Majority of study subjects were from age group 36-45 yrs contributing 25 (62.5%) followed by >45 yrs 12(30%) and 03 (7.5%) were from 25-25 yrs respectively. This indicates high prevalence of fibroids in women in reproductive age group. A similar study by Munusamy MM et al (2017) [11] revealed that, the mean age was 46 years among cases of fibroid. Another study by Kulkarni MR et al (2015) [12] concluded that, leiomyoma is the most common benign tumor of the uterus and commonly affects the women most commonly in the third decade. A study by Ramya Subramanian et al (2019) [13] observed similar finding with current study. It was seen that, 42% of patients were between 40-45 years.

Majority of study subjects were educated upto more than 10<sup>th</sup> std contributing 26 (65%) followed by secondary 7 (17.5%), Primary 4 (10%) and 3 (7.5%) were illiterate. This indicates improved literacy status in rural area. Majority of females received education more than higher secondary level. Majority of study participants in present study were

homemakers contributing 21 (52.5%) followed by employed 09 (22.5%), Laborers 08 (20%) and 02 (5%) were shop keeper respectively.

Most of the subjects in this study were from Lower socioeconomic classes (III,IV,V) contributing 28 cases (70%) and 12 (30%) were from upper classes (I,II). This might be due to rural background of study subjects and wide spread poverty in rural India.

A study by Jalandhara J et al (2018) [14] also concluded that, Leiomyomas are most commonly seen in women of child-bearing age of life. Our study agrees with findings of these studies. Most of study participants were 2<sup>nd</sup> para contributing 21 (52.5%) followed by 3<sup>rd</sup> para 11 (27.5%), 1<sup>st</sup> para 02 (5%), 1 (2.5%) was 4<sup>th</sup> Para and 05 (12.5%) were nulliparous respectively. A similar study by Mangala Gouri et al (2018) [16] revealed consistent findings with present study. It was revealed that, Leiomyomas occurred mostly in multiparous. Another study by Ramya Subramanian et al (2019) [13] showed similar findings with current study.

Uterine size in majority of subjects was 10-14 weeks contributing 24 cases (60%) followed by 16-18 weeks in 13 (32.5%) and >20 weeks 03 (7.5%) respectively. A study by Munusamy MM et al (2017) [11] found that, average size of uterus in cases of fibroid was 12-28 weeks. Another study by Ramya Subramanian et al (2019) [13] revealed consistent findings with present study. It was observed that, huge fibroids, belonging to group 4 of FIGO classification with average size of 15 cm. A study by Jalandhara J et al (2018) [14] showed similar findings with this study. It was observed that, 68 %

were of the size of 16 weeks gravid uterus, 23 % were of the size between 16 and 20 weeks.

Most of study participants were obese (BMI >25 Kg/m<sup>2</sup>) contributing 21 (52.5%) and 19 were normal 19(47.5%). This indicates high proportion of fibroids in obese women in reproductive age group.

A study by Srilatha J et al (2017) [10] shows similar findings with present study. It was observed that, The body mass index for most of subjects was within the normal range (60.3%), while some were slightly overweight.

Medical conditions associated with uterine fibroids in present study were hypertension 6 (15%), HTN with DM 02 (5%), hypothyroidism 03 (7.5%) and DM in 1 case (2.5%) were present in study subjects. A study by Kulkarni MR et al (2015) [12] reported consistent findings with this study. Subclinical hypothyroidism was found in 7 %, Diabetes was found in 8 % and hypertension in 12 %. Cholelithiasis was reported only in 2 % of cases

Anaemia was present in most of the study subjects contributing 27 (67.5%). This might be due to heavy blood loss during menstruation among cases of fibroid. A study by Munusamy MM et al (2017) [11] found that, Women (66%) presented with severe anaemia due to menorrhagia. Our study agrees with this study.

Menorrhagia was the most common menstrual problem among study subjects in current study contributing 19 (47.5%) followed by dysmenorrhoea 13(32.5%), polymenorrhagia 10(25%), PUB 06 (15%), metrorrhagia and polymenorrhoea 05 cases (12.5%) each respectively. A study by Maddila Yamuna, D. Hemalatha Devi (2020)<sup>85</sup> revealed consistent findings. It was seen that, among menstrual disturbances menorrhagia most common in 80 % of cases. A study by Jalandhara J et al (2018) [14] also revealed that, the most common mode of presentation was menstrual disturbances (76 %), among which menorrhagia was seen in 64 % of the cases.

Increased urinary frequency was seen in majority of subjects contributing 16 cases (40%) followed by dysuria in 15 (37.5%) and urinary retention in 13 cases (32.5%) respectively. A study by Jalandhara J et al (2018) [14] showed similar findings with present study where Urinary Symptoms were seen in 12 % cases.

Lower pelvic pain was most common pain symptom contributing 17 cases (42.5%) followed by backache 09(22.5%) and lower limb pain in 03 cases (7.5%) respectively. A study by Jalandhara J et al (2018) [14] showed similar findings with present study where pain symptoms were present in 12% of cases.

Intramural fibroids were the most common type of fibroid among study subjects contributing 21 (52.5%) followed by subserosal 09(22.5%), submucosal 08(20%) and cervical fibroid contributed 02 (5%) respectively. A study by Maddila Yamuna, D. Hemalatha Devi (2020) [15] revealed consistent findings. It was seen that, Intramural fibroids were most common variety accounting to 69% of cases followed by subserosal 22%, submucosal 8% respectively. A study by Jalandhara J et al (2018) [14] showed similar findings with present study where, most common site of leiomyomas was intramural (60%) followed by subserosal leiomyomas (20%).

Total abdominal hysterectomy with bilateral salpingoopherectomy was most common management among cases of fibroid contributing 27 (67.5%), followed by Myomectomy 08 (20%), TAH 03 (7.5%), and Vaginal hysterectomy 02 (5%) respectively.

A study by Maddila Yamuna, D. Hemalatha Devi (2020) [15] revealed consistent findings. It was reported that, 50% of cases were undergone TAH only, 28% cases were undergone TAH with BSO. 4% of cases were undergone myomectomy.

Most common endometrial pattern among cases of fibroid was proliferative contributing 23 (57.5%) followed by secretory 6 (15%), hyperplastic 05 (12.5%), atrophic 04 (10%) and cystic glandular hypertrophy 02 (5%) respectively.

A study by Maddila Yamuna, D. Hemalatha Devi (2020) [15] revealed consistent findings. It was seen that, Endometrial pattern was proliferative 68% of cases. Cystic ovaries were seen in 10% of cases and adenomyosis was seen in 14% of cases. This indicates hyperestrogenic states associated with fibroids. Proliferative endometrium was noted in 96%, while secretory changes were noted in 4% in a study by Jalandhara J et al (2018) [14].

Hyaline degeneration was seen in 4 cases (10%) followed by cystic 03 (7.5%), fatty and calcareous degeneration in 02 cases (5%) each. A study by Maddila Yamuna, D. Hemalatha Devi (2020) [15] revealed consistent findings. It was seen that, Secondary changes such as hyaline, mucoid, cystic and fatty degeneration were also seen, most commonly in intramural leiomyoma.

A study by Jalandhara J et al (2018) [14] found that, cystic ovaries in 8 % of the cases. A variety of cysts were noted such as simple serous cyst, follicular cyst, serous/ papillary cystadenoma, dermoid cyst, and corpus luteal cyst. A similar study by Mangala Gouri et al (2018) [16] revealed consistent findings with present study. It was seen that, Hyalinisation (16.9%) was the commonest secondary degenerative change followed by cystic (9%) and myxoid (1.6%) change.

**Conclusion:**

Majority of study subjects were from age group 36-45 years indicating high prevalence of fibroids in women in reproductive age group.

Most of study participants were 2<sup>nd</sup> para that indicates high proportion of fibroid in child bearing age group. Uterine size in majority of subjects was 10-14 weeks. Obesity, comorbid conditions like hypertension, diabetes mellitus, hypothyroidism and anaemia were associated medical conditions in fibroid cases. Menorrhagia was the most common menstrual problem among study subjects followed by dysmenorrhoea.

That explains for high prevalence of anaemia in fibroid cases. Increased urinary frequency, lower pelvic pain and dysuria were most common presenting complaints. Intramural fibroids were the most common type of fibroid among study subjects. Most of the cases were treated with total abdominal hysterectomy with bilateral salpingoopherectomy. Proliferative pattern was most common endometrial pattern after histopathological examination and hyaline degeneration was seen in most the cases with degenerative changes in current study.

Early diagnosis of fibroid is very important for management of patients with medical treatment. Newer medical treatment aids in reducing size of fibroid which can result in minimal access surgery and can avoid major surgery in patients of fibroid.

**References**

- Okolo S. Incidence, aetiology and epidemiology of uterine fibroids. *Best Pract Res Clin Obstet Gynaecol*.2008; 22(4): 571-588.
- Chen CJ, Buck GM, Courey NG. Risk Factors for uterine fibroids among women undergoing tubal sterilization. *Am J Epidemiol*.2001; 153: 20-26.
- Stewart EA. Uterine fibroids.2001; *The Lancet* 27: 357.
- Walach EE, Vlahos NF. Uterine myomas- An overview of development. *Clinical Features and Management Obstet Gynaecol*.2004; 393-406.
- Tropeano G, Amoroso S, Scambia G. Non-surgical management of uterine fibroids. *Hum Reprod Update*.2008; 14(3): 259-274.
- Bradley LD. Uterine fibroid embolization; a viable alternative to hysterectomy. *Am J Obstet Gynaecol* 201L: 2009; 127-135.
- Eckel RH, Grundy SM, Zimmet PZ. The metabolic syndrome. *Lancet* 2005; 365:1415-28.
- Hebbar S, Chayya V, Rai L, A Ramachandran. Factors influencing endometrial thickness in postmenopausal women. *Ann Med Health Sci Res*. 2014 Jul-Aug;4(4):608-614.
- Faerstein E, Szklo M, Rosenshein NB. Risk factors for uterine leiomyoma: A practice-based case-control study. Atherogenic risk factors and potential sources of uterine irritation. *Am J Epidemiol* .2001; 153:11-19.
- Srilatha J, Malathi V. Prevalence of fibroids: a study in a semiurban area in Telangana, India. *Int J Reprod Contracept Obstet Gynecol*.2017; 6:5247-50.
- Munusamy MM, Sheelaa WG, Lakshmi VP. Clinical presentation and prevalence of uterine fibroids: a 3-year study in 3-decade rural South Indian women. *Int J Reprod Contracept Obstet Gynecol* 2017;6: 5596-601.
- Kulkarni MR, Dutta I, Dutta DK. Clinicopathological Study of Uterine Leiomyomas: A Multicentric Study in Rural Population. *The Journal of Obstetrics and Gynecology of India*. September–October 2016; 66(S1): S412–S416.
- Ramya Subramanian, Hephzibah Kirubamani. Spectrum of Fibroid Presentation in a Tertiary Care Centre. *Int. J. Pharm. Sci. Rev. Res.*, 54(1), January - February 2019; Article No. 11, Pages: 64-66.
- Jalandhara J, Mehta K, Desai R, Parakh P, Choudhary G. Clinicopathological study of uterine leiomyomas: A multicentric study in rural population. *International Journal of Medical and Health Research*. June 2018; 4; (6): 16-18.
- Maddila Yamuna, D. Hemalatha Devi. Clinical, Sonographical, Surgical, Histopathological study of fibroid. *IAIM*, 2020; 7(2): 6-12.
- Mangala Gowri, Geetha Mala, Srinivasa Murthy, Vedavathy Nayak. Clinicopathological study of uterine leiomyomas in hysterectomy specimens. *Journal of Evolution of Medical and Dental Sciences*. 2018;2(46): 9002-9009.