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Original Research Article

Association between uterine leiomyoma with body mass index and parity in the women of coastal Karnataka, India

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ABSTRACT

Background: Fibroid is the commonest benign tumor of the uterus and also commonest benign solid tumor in females. Fibroids are found to be 2-3 times more prevalent in obese women, specially the one's with central obesity and in those with BMI > or = 35. Epidemiologic data also shows pregnancy is associated with reduced risk of fibroids. So, the present study will be a cross-sectional study which will be undertaken to know the association of uterine leiomyoma with BMI and parity in the women of coastal Karnataka.

Methods: An analytical cross-sectional study was performed among the 100 patients attending OPD at the department of obstetrics and gynecology, Karwar institute of medical sciences from June 2018 to August 2018. Women suspected to have fibroid based on their symptoms were made to undergo ultrasonography. Comparison was made between the parity, body mass index of the patient and the size of the uterine fibroid visualized.

Results: Out of 100 women studied 63 were nulliparous and 37 women were multiparous. Incidence of fibroid is inversely proportional to parity. When BMI < 18 only 6 women had fibroid, when BMI > 25, 57 women had fibroids and between 18-25 group 37 women were diagnosed with fibroid.

Conclusions: The fibroid showed directly proportional association with BMI. Greater the BMI, more was the risk of fibroids. The fibroid showed inversely proportional association with parity. Greater the parity of the women lesser was her chances of being at risk of having fibroid.

Keywords: Body mass index, Fibroids, Leiomyoma, Parity

INTRODUCTION

Fibroid is the commonest benign tumor of the uterus and also commonest benign solid tumor in females.¹ Tumor is composed of smooth muscle and fibrous connective tissue so named as uterine leiomyoma, myoma or fibromyoma.

Most common type among them is the intramural type (75%) followed by subserous type (15%) and submucous (5%). In rare cases fibroids can also be of cervical and pseudo cervical type (1-2%).

The incidence of uterine fibroid all around the world is 4.5-68.6% of which 15-25 million Indian women suffer from fibroids.^{2,3} The prevalence is highest among the women of 21-45 years of age. Risk factors for fibroid are nulliparity, obesity and hyper-estrogenic state.⁴ The women having fibroid presents with varying range of symptoms like menorrhagia, metrorrhagia, dysmenorrhea, lower abdominal pain and abdominal enlargement etc.

The changes of body mass index influence the incidence of uterine fibroids. Fibroids are found to be 2-3 times

more prevalent in obese women, specially the one's with central obesity and in those with BMI > or = 35.⁶ This is because peripheral fat is also linked with production of circulating estrogen called estrone. Also, an obese individual show decreased levels of serum hormone binding globulin (SHBG).⁷

Epidemiologic data also shows pregnancy is associated with reduced risk of fibroids.⁸ Greatest protective effect of parity occurs for pregnancies during mid-reproductive years.⁸ Reduced risk is also due to breastfeeding as it suppresses all the ovarian hormones. Uterine fibroids can be one to many and of varying size diagnosed by pelvic examination and from ultrasound scanning. This size is found to regress in the postmenopausal women.⁹

So, the present study will be a cross-sectional study which will be undertaken to know the association of uterine leiomyoma with BMI and parity in the women of coastal Karnataka.

Objectives of this study was to find association between body mass index (BMI) and uterine leiomyoma and to find association between parity and uterine leiomyoma.

METHODS

An analytical cross-sectional study was performed among the patients attending OPD at the department of obstetrics and gynecology, Karwar institute of medical sciences from June 2018 to August 2018. 100 patients attending gynaec OPD were included in the study. Consent was obtained from all the women who will be enrolled in the study and confidentiality of the records were maintained. Ethical committee clearance was obtained from Institutional Ethical Committee before the start of the study.

Sampling technique was universal sampling.

Inclusion criteria

- All non-pregnant women of the age group 21-50 years attending the out-patient department.

Exclusion criteria

- Post-menopausal women
- Women with hormonal disorders like Cushing's syndrome (based on previous reports).

The weight, height and parity of the women attending the out-patient department during the above-mentioned study period were noted down. BMI was calculated based on height and weight using the formula:

$$BMI = \frac{\text{weight (in kgs)}}{[\text{Height (in meters)}]^2}$$

Women suspected to have fibroid based on their symptoms such as menorrhagia, dysmenorrhea, infertility, recurrent pregnancy loss, lower abdominal pain, abdominal enlargement were made to undergo ultrasonography. Trans-abdominal ultrasonography was done using the machine "Aloka prosound alpha".⁶

On USG fibroids appear as well defined, solid masses with a whorled appearance.¹⁰ These are usually hypoechoic compared to the myometrium, but sometimes may be of similar echogenicity.¹⁰ Even non-calcified fibroids often show a degree of posterior acoustic shadowing which is more prominent in calcified fibroids.¹⁰ The assessment and evaluation of size of the fibroid is done in 2D using two perpendicular planes.¹¹ In case of 3D view the fibroid is analysed in mid-sagittal or transverse plane.¹¹ If fibroids were detected, the size was measured in 2 dimension and site of fibroid was noted down. Comparison was made between the parity, body mass index of the patient and the size of the uterine fibroid visualized.

Statistical analysis

Statistical analysis was done using SPSS software. Results were displayed in percentages and tables. Appropriate tests of significance will be used for association.

RESULTS

Table 1 shows age wise distribution of the subjects with their parity. There was no significant difference noted between the subjects with relation to their age and parity.

Table 1: Age wise, parity distribution of the subject.

Age (in years)	Parity		p-value
	Nulliparous	Multiparous	
< 20	05	01	1.7
20-30	15	07	
30-40	10	26	
40-50	08	28	

Table 2: BMI of the subjects.

BMI	N = 100	Percentage	p-value
< 18	08	8	> 2.8
18-25	35	35	
> 25	57	57	

Table 2 shows no significant differences were noted between the subjects in relation to their BMI.

Table 3 shows the presenting complaints between the subjects. Majority of the patients had menorrhagia as their main complaint. However, pain abdomen alone contributed to 14% of the complaints, pain with

menorrhagia was seen in 29% patient. Less commonly infertility (6%), and other complaints were noted. Statistically no significant differences were noted.

Table 3: Presenting complaints.

Presenting complaints	N = 100 (%)	p-value
Pain abdomen	14 (14)	> 1.756
Menorrhagia	42 (42)	
Pain abdomen and menorrhagia	29 (29)	
Infertility	6 (6)	
Mass per vagina	03 (3)	
Others	06 (6)	

Table 4 shows the association between symptomatology and the size of the fibroid. Menorrhagia was a significant complaint noted in the study population and it increased with the increase in size of the fibroid.

Table 4: Association between symptomatology and size of fibroid.

Symptomatology (N = 100)	Size of the fibroid		p-value
	1-5 cm	5-10 cm	
Pain abdomen	5	8	> 0.05
Menorrhagia	12	33	0.0003
Pain abdomen and menorrhagia	16	13	> 0.05
Infertility	3	7	> 0.05
Mass p/v	3	0	> 0.05

Table 5 shows the association between parity and fibroids, out of 100 women studies 63 were nulliparous and 37 women were multiparous. There is significant relation between fibroids and women being nulliparous. Incidence of fibroids is inversely proportional to parity.

Table 5: Association between parity and fibroids.

Parity	Fibroids N = 100 (%)	P-value
Nulliparity	63 (63)	< 0.01
Multiparity	37 (37)	< 0.03

Table 6: Association between BMI and fibroids.

BMI	Fibroids N = 100	P-value
< 18	06	> 0.05
18-25	37	< 0.05
> 25	57	< 0.01

Table 6 shows the association between BMI and fibroids. When BMI < 18 only 6 women had fibroid, whereas there is significant relation between increasing BMI and incidence of fibroids. When BMI > 25, 57 women had fibroids and between 18-25 group 37 women were diagnosed with fibroid. Increase in BMI is directly proportional to increased incidence of fibroid.

DISCUSSION

Fibroid is the commonest benign tumor of the uterus and also commonest benign solid tumor in females.¹ Tumor is composed of smooth muscle and fibrous connective tissue so named as uterine leiomyoma, myoma or fibromyoma. The incidence of uterine fibroid all around the world is 4.5-68.6% of which 15-25 million Indian women suffer from fibroids.^{2,3} The prevalence is highest among the women of 21-45 years of age. Risk factors for fibroid are nulliparity, obesity and hyper-estrogenic state.⁴ The women having fibroid presents with varying range of symptoms like menorrhagia, metrorrhagia, dysmenorrhea, lower abdominal pain and abdominal enlargement etc.

The changes of body mass index influence the incidence of uterine fibroids. Fibroids are found to be 2-3 times more prevalent in obese women, specially the one's with central obesity and in those with BMI > or = 35.^{5,6} Epidemiologic data also shows pregnancy is associated with reduced risk of fibroids.⁸ Greatest protective effect of parity occurs for pregnancies during mid-reproductive years.⁸ So the present study was a cross-sectional study which was done to know the association of uterine leiomyoma with BMI and parity in the women of coastal Karnataka.

An analytical cross-sectional study was performed among the patients attending OPD at the department of obstetrics and gynecology, Karwar institute of medical sciences from June 2018 to August 2018. 100 patients attending gynaec OPD were included in the study. All non-pregnant women of the age group 21-50 years attending the out-patient department.

The weight, height and parity of the women attending the out-patient department during the above-mentioned study period were noted down. Women suspected to have fibroid based on their symptoms such as menorrhagia, dysmenorrhea, infertility, recurrent pregnancy loss, lower abdominal pain, abdominal enlargement were made to undergo ultrasonography. If fibroids were detected, the size was measured in 2 dimension and site of fibroid was noted down. Comparison was made between the parity, body mass index of the patient and the size of the uterine fibroid visualized.

A retrospective study was conducted by Babah OA et al.¹² Among 169 women of age group 35-44 in Nigeria for a period of 5 years. This study showed that about 69.16% of the study population who suffered from fibroids were obese with a BMI > 25 and 83.23% of the suffering women were nulliparous. The increased incidence among those with high BMI is due to elevation of oestrogen levels through aromatization of androgens in adipose cells and in nulliparous women it is due to repeated exposure to oestrogen.¹² A retrospective study was conducted by Maturitas PF et al, among 2239 women in Italy for a period between 1997 and 2003.¹³ This study

showed that about 95% women of the study population had BMI of more than or equal to 26. The risk of fibroid was also found to be lower among parous women than in the nulliparous ones and the risk decreased with the number of births.¹⁴

A prospective cohort study was conducted by Wise LA et al, among 2146 women in US for a period of 4 years between 1997 to 2001.¹⁴ This study showed that the women with BMI between 30.0-32.4 had highest risk of uterine fibroids. Risk was higher among parous women and weight gain since age 18 was positively associated with the risk, but only among parous women.¹⁵ Our study showed similar results with that of association with fibroid and BMI but the association of fibroid and parity in our study showed that nulliparous women were at greater risk of fibroid. A case-control study was conducted by Sato F et al, Among, 100 women with fibroids in Japan and 200 controls free of fibroids were considered.¹⁵ This study showed that women with BMI > 24 had highest risk.¹⁵

Similar to the above studies our study with 100 women also showed the similar results with maximum incidence of fibroids being among the women of BMI > 25 as increased fat content of body causes rise of circulating estrogen increasing the risk of fibroid.

Among the 100 women considered fibroid also showed a direct rise in the risk among the nulliparous women because pregnancy inhibits the ovarian hormones and acts as a protective factor against fibroids.

CONCLUSION

The fibroid showed directly proportional association with BMI. Greater the BMI more was the risk of fibroids. In our study the BMI cut off showing highest incidence was above 25. The fibroid showed inversely proportional association with parity. Greater the parity of the women lesser was her chances of being at risk of fibroid.

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