

Research Article

Correlation of body mass index and age of menopause in women attending medicine and gynaecology department of a tertiary care centre

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ABSTRACT

Background: Menopause is a physiological change that every woman experiences in her life. Some find it extremely troublesome and for some it is a gradual change. Multiple factors determine the age at which menopause occurs, also deciding the course of menopause. How do height, weight and body mass index affect the same is the basis of this research.

Methods: 500 women who underwent natural menopause were examined to assess their height and weight. The body mass index was henceforth calculated. The results were statistically analysed using Pearson correlation.

Results: The age of menopause varied with the increasing height, weight and BMI. Though no statistical significance was found in between height and age of menopause, there was a definite correlation between weight and BMI of the women.

Conclusions: Time long obesity and higher BMI is known for being associated with many diseases like hypertension, diabetes, metabolic syndrome etc. This study indicates how it affects the physiologic change i.e. menopause also. Women with higher BMI tend to have higher age of attaining menopause.

Keywords: BMI, Menopause, Weight, Obesity

INTRODUCTION

A woman must wait for her ovaries to die before she can get her rightful personality back. Postmenstrual is the same as premenstrual where she is once again what she was before the age of twelve; a female a human being who knows that a month has thirty days, not twenty five. This quote by Florence King, aptly outlines the troubles of five days bleeding during the menstrual cycle.

Apart from surgery, hormone replacement therapy or age at menarche, there are various other parameters that influence the timing of attaining menopause. The nutritional status and built being one of them. Obesity that has grown by leaps and bounds in the present

scenario affects almost all medical conditions and physiological too. The menopause is a natural change. At the chemical level menopause is due to a decrease in production of estrogen and progesterone. This typically occurs between 45 and 55 years of age.

The 10 years variation accounts for the research. Multiple factors influence the age of menopause. Delayed menopause is seen in women due good health and better nutrition. It is also seen in women with uterine fibroids, women with high risk of endometrial carcinoma. Smoking induces premature menopause.

The most common symptoms of menopause and perimenopause are hot flashes and vaginal dryness; as many

as 75% of women experience hot flashes.¹ During perimenopause, many women also experience irregular bleeding or spotting. After menopause, the risk of chronic diseases including osteoporosis, heart disease and risk increases. Obstetrics and gynaecology, physicians whose primary responsibility is women's health, play a leading role in helping treat the symptoms of menopause and the prevention of chronic disease.

Here in our small study we have tried to correlate the genetic determining factors i.e. height of the woman and the external nutrition status of the woman as independent factors influencing the age of attaining menopause.

Aim and objectives of the study were to study the height, weight and BMI of the postmenopausal women attending medical and gynaecology departments at a tertiary care centre and to try and establish a correlation between the various parameters.

METHODS

The study was conducted over a period of one year. A total of 500 women attending medicine and gynae OPD were studied and their height, weight and BMI were calculated.

Inclusion criteria

- Women who attained natural menopause
- Not on hormonal replacement therapy.

Exclusion criteria

- Women who underwent surgical menopause, oophorectomy
- Women on hormonal replacement therapy
- Women undergoing chemotherapy or radiotherapy for different genital carcinomas.

The study was a retrospective questionnaire based. The study took one year to accumulate and analyse the data statistically by Pearson correlation. The study did not require any drug or device trial, so ethical committee exemption was taken.

RESULTS

Relation of average age of menopause with height

Most of the women were having an average height between 161-170 cm 334 women belonged to this group forming 66.8% of the total women; next largest group was that of women of height between 151 to 160 cm 89 women belonged to this group forming 17.8% of all. The average age of menopause in both the groups was 54 years. 77 women belonged to the short stature group with height between 141-150 cm these formed 15.4% of the patients. The average age of menopause in this group was

48 years. This was a significant difference indicating a relation between the two. This however did not show any statistical significance. Pearson correlation between age and height: 0.009; (p value 0.833).

Study concludes that there is no relation between the genetically predetermined height and age of menopause.

Table 1: Relation of average age of menopause with height.

Height (cm)	Number of women	Percentage of women	Average age of menopause
141-150	77	15.4%	48
151-160	89	17.8%	54
161-170	334	66.8%	54

Relation of average age of menopause with weight

Most of the women had an average weight between 71 – 80 kgs. 293 women i.e. 58.6% of women belonged to this group. The average age of menopause was 53 years. As the weight increased i.e. weight more than 80 kgs, the age of menopause also increased to 54 years. 169 women (33.8%) weighed more than 80 kgs.

On the opposite side 7 women (1.4% of total sample size) weighed less than 60 kgs. Their age of menopause was well below at 49 years. The strong association of obesity and altered hormonal milieu has been well established. This finding reconfirms the association. There was definite statistical significance between the weight and age of menopause by Pearson correlation: 0.282; (p value: 0.000).

Study concludes that as the weight and obesity increases the average age of menopause also increases.

Table 2: Relation of average age of menopause with weight.

Weight (kg)	Number of women	Percentage of women	Average age of menopause
51-60	7	1.4%	49
61-70	31	6.25%	53
71-80	293	58.6%	53
>81	169	33.8%	54

Relation of average age of menopause with BMI

There was a definite correlation between the BMI and the age at menopause of the women. The trends showed that as the BMI increased, the age of menopause also increased. No patient belonged to the underweight group BMI less than 18.58 women belonged to the normal BMI group (18.5-22.9). These formed 1.6% of all the women. The average age of menopause was 52 years in this group. In the overweight group with BMI 23-24.9, the average age of menopause was 54 years. These women

formed 48.6% of the sample size. 243 women belonged to this group.

The largest group was of the obese women whose BMI was more than 25. 249 women belonged to this group and it had the highest age of menopause, 55 years. In this group also when subdivided into three, the trends were reconfirmed. In the group with BMI 25-29.9, the average

age at menopause was 54 years. In the group with BMI 30-34.9, the average age at menopause was 55 years and in the group with BMI >30, the average age at menopause was 56 years.

Higher the BMI higher was the age of menopause. These values also showed a definite statistical correlation by Pearson: 0.291 (p value: 0.000).

Table 3: Relation of average age of menopause with body mass index (BMI).¹¹

Body mass index (BMI)	Number of women	Percentage of women	Average age of menopause
Normal			
18-22.9	8	1.6%	52
Overweight			
23-24.9	243	48.6%	54
Obesity			
Class 1- 25-29.9	181	36.2%	54
Class 2- 30-34.9	52	10.4%	55
Class 3- >35	16	3.2%	56

Table 4: Statistical correlation and significance.

		Age	Height	Weight	BMI
Age	Pearson Correlation	1	0.009	0.282**	0.291**
	significance (2-tailed)		0.833	0.000	0.000
	N	500	500	500	500
Height	Pearson Correlation	0.009	1	0.438**	-0.217**
	significance (2-tailed)	0.833		0.000	.000
	N	500	500	500	500
Weight	Pearson Correlation	0.282**	0.438**	1	0.780**
	significance (2-tailed)	0.000	0.000		0.000
	N	500	500	500	500
BMI	Pearson Correlation	0.291**	-0.217**	0.780**	1
	significance (2-tailed)	0.000	0.000	0.000	
	N	500	500	500	500

**Correlation is significant at the 0.01 level (2-tailed), Pearson correlation is applied to assess relationship between age with height, Weight, BMI, Between age and height: 0.009; p value- 0.833 (not significant), Between age and Weight: 0.282, p value:0.000 (significant), Between age and BMI : 0.291, p value: 0.000 (significant)

DISCUSSION

A women’s life undergoes different phases in life and menopause is one of them. There are many factors affecting the timing and course of this change in her life. There are not only medication that affect the same but studies reflect geographic and international differences in the age at menopause which indicate a genetic, socioeconomic, environmental, racial/ethnic, or lifestyle.² Indian geographical differences and their socioeconomic differences also plays a role in the age of attaining menopause.

Women living in Himalayan high altitude undergo natural menopause 1 to 1.5 years earlier than those living at lower altitudes.³ Diet also plays an important role in

the menopause. Not only does it affect the timing but also the after conditions associated with menopause. One early study from Papua, New Guinea, suggested that malnourished women ceased menstruation about 4 years earlier than well-nourished women.⁴ Obesity is associated with many disease processes.

How it affects this natural change is time and again proven in multiple studies carried out worldwide. In a study conducted by Akahosi M et al, over 1136 natural menopause women, the age of menopause ranged from as early as 45-49 years (mean 48.3+/-1.2 years).⁵ In the women attaining menopause late the BMI was significantly higher, p value <0.05. The entire premenopausal trend in BMI in late menopausal women shifted upward compared to that in early menopausal

women. Similar results were obtained in our study where higher BMI was associated with a higher age at menopause (p value 0.000).

317 women participated in the study conducted by Blew RM et al, wherein sedentary, postmenopausal women (ages 40 to 66 years; BMI 18 TO 35kg/m², 3-10 years postmenopausal).⁶ In this study height, weight, BMI and percent fat as assessed by DXA, were measured. A moderately high relationship was observed between BMI and percent fat with SE of estimate of 3.9%. These findings were further emphasizing the effect of obesity.

In a different geographical scenario where the life style and ethnicity varies in Azarbaijan, there were significant differences between age, postmenopausal age, weight and BMI of the women. p values <0.001 were seen in the study conducted in 240 women by Hejazi J et al.⁷ Environmental variables that might affect the age at menopause were analysed by means of the segmentation method AID by Brand PC et al.⁸ Height was shown to be a significant discriminating variable in their study. This finding did not find similarity in our study where height was not found to be statistically significant.

Obesity and physical activity play a pivotal role during menopause. The body fat when higher is also a source of reproductive hormones thus interfering with the physiology of menopause. Postmenopausal symptoms in Turkish women were studied by Tan MN et al.⁹ In their study 305 women between ages 45 to 60 were recruited. They found though very contrary results by reporting BMI was not associated with total menopausal symptoms and the subscales, excluding depressive mood (p=0.009). Similar findings were found in a large cross-sectional study of Japanese women which found that higher intakes of fat, cholesterol, and coffee were significantly associated with earlier natural menopause after controlling for age, total energy, parity, menarche age, and relative weight.¹⁰

The role of dietary fiber, phytoestrogens, fat, protein, and other nutrients in affecting age at menopause and duration of the peri-menopause remains to be systematically studied, but has potentially important implications for prevention of chronic disease in midlife and older women.

CONCLUSION

There has been an upward surge in the improving lifestyle and socioeconomic status of the women worldwide. Weight and associated higher BMI is also associated with the higher age at menopause. The body fat distribution of the women interferes with the natural reproductive hormone production and hence also the

menopause. To add number of years of having a free body with a full 30 days in a month a well-controlled diet, weight and hence BMI is an important prerequisite.

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