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Evaluation of Some Risk Factors on the Age at Menopause in South Indian Women

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Abstract

Menopause, a natural resting phase to the ovaries puts an end to the fertile period of a woman. The decline of ovarian hormones are found as the key factors to this transitional phase in the life cycle of women. However, it is difficult to conclude the causative factors for the ovarian dysfunction. The present study is carried out to ascertain the role of some of the socio-economic, lifestyle and environmental factors in this biological transition. The role of heridity on the age at onset of menopause is ruled out in the present study. The outcome of the present study is putforward by a hypothesis called "waning hypothesis", which explains the crucial role of reproductive hormones in menopause.

Keywords: Amenorrhea, cluster, sub-continent, transitional phase.

1. Introduction

Menopause, a feminine milestone that marks the transition to another period of life affects a woman's self image, sexual identity and quality of life. The age at onset of natural menopause is not unique among women even in mothers and their daughters. A cluster of factors are controlling this natural event, but it is very difficult to pinpoint the key factor other than the reproductive hormones which are over ruling this prime event in a woman's life.

Amenorrhea for an year without any pathological or psychological reasons is said to be a natural menopause [1]. Natural or physiological menopause is associated with a part of women's normal ageing process and it is a multifactorial trait. A bundle of risk factors including lower educational attainment and/or socio-economic status, often determined by the occupational status of women is also associated with early age at menopause [2-4]. Vegetarian diet [5,6] higher total intakes of fat, meat and protein [2,6], consumption of coffee[7], birth control devices especially using copper-T [8,9] and rural-urban life [10] are found as the other major determinants of age at onset of menopause.

To understand and identify the role of some important determinants on the age of attainment at this biological transition in women, the present study is carried out in menopausal women of all walks of life in the southern most part of the Indian sub-continent.

2. Materials and methods

The study includes 3000 subjects who have just crossed the menopausal period and their 3000 mothers with rural, semi-urban and urban backgrounds. The survey has been conducted during the period 2011 and 2012 in Kanyakumari District, Tamil Nadu, India. The respondents are settled in 81 settlements with a spread of approximately 50 km on road. The lowest age of the subjects are 29 yrs while the highest age is 69 yrs and the mean menopausal age is around 47.28±4.5 yrs.

A standard questionnaire is used to collect the basic data from the respondents through door to door survey [11]. For a convenient presentation the respondents are grouped as 3 divisions (viz) early (29-44

yrs), normal (45-55yrs) and late menopausal (56-63 yrs) women. The type of menopause (i.e.) natural or surgical or by other means is collected personally from the subjects and their identity is kept as a secret through out the study. Ethics Committee's recommendations are strictly adhered during the entire course of study.

The prime role of socio-economic, lifestyle and some prominent environmental factors on the age at onset of menopause are the main target for this present study. Statistical analyses have been made to understand the validity of the data [12].

3.Results

The survey population includes 72(2.4%) illiterates, 2910 (97%) with low level of education and 18(0.6%) highly qualified women. The illiterate group includes 8(11.11%) early, 59(81.95%) normal and 5(6.94%) late menopausal subjects. There are 784(26.94%) early, 2074(71.27%) normal and 52(1.79%) late menopausal women in the low educational category and 5(27.78%) early, 13(72.22%) normal and no late menopausal respondents in the high level educational group.

There are 713(27.21%) early, 1857(70.88%) normal and 50 (1.91%) late menopausal housewives, while the number of early, normal and late menopausal subjects in coolies are 35(19.23%), 144(79.12%), 3(1.65%) respectively. Private sector employee category includes 35(26.32%) early, 97(72.93%) normal and 1(0.75%) late menopausal women, where as 14(21.54%) early, 48(73.85%) normal and 3(4.62%) late menopausal women are Government employees.

The study includes 580(19.33%) poor, 2056(68.53%) middle and 364(12.13%) upper class subjects. In poor class there are 113(19.48%) early, 455(78.45%) normal and 12(2.07%) late menopausal women. Middle class includes 613 (29.82%) early, 1408(68.48%) normal and 35(1.7%) late menopausal subjects. There are 71(19.5%) early, 283(77.75%) normal and 10(2.75%) late menopausal women in high class (Table.1.)

Out of 3000 subjects, 1091(36.37%) are urban and 1909(63.63%) are rural respondents. The urban women comprises 173(15.86%) early, 903(82.77%) normal and 15(1.37%) late menopausal cases. The rural subjects include 624(32.69%) early, 1243(65.11%) normal and 42(2.2%) late menopausal women.

It is evident from the study that, out of 24 (0.8%) vegans, 4(16.67%) are early, 19(79.17%) normal and 1(4.17%) late menopausal women. 793(26.65%) early, 2127(71.47%) normal and 56(1.88%) late menopausal women are identified as mixed diet users. 115(20.1%) early, 442(77.27%) normal and 15(2.62%) late menopausal subjects are found as regular coffee users and 682(28.09%) early, 1704(70.18%) normal and 42(1.73%) late menopausal women are identified as non-users of coffee.

The survey comprises 11(0.37%) oral pills users, 70(2.33%) copper-T users, 1510 (50.33%) sterilized and 1409 (46.97%) birth control device non-users. There are 9(81.82%) normal and 2(18.18%) late menopausal women who had used oral pills, where as 37(52.86%) early and 33(47.14%) normal menopausal women have used copper-T. 648(42.91%) early and 862(57.09%) normal menopausal women have undergone sterilization, while the birth control device non-used group includes 112(7.95%) early, 1242(88.15%) normal and 55(3.9%) late menopausal mothers (Tabe.2.)

The menopausal agewise distribution of the subjects and their mothers are shown in table.3. The present study includes 797(26.57%) early, 2146(71.53%) normal and 57(1.9%) late menopausal subjects. The distribution of the subjects' mothers with respect to their menopausal age comprises 25(0.83%) early, 2683(89.43%) normal and 292(9.74%) late menopausal cases.

It is clear from the study that, 25 early menopausal mothers are having 7(28%) early, 17(68%) normal and 1(4%) late menopausal daughters. Similarly the 2683 normal menopausal mothers are with 705(26.28%) early, 1924 (71.71%) normal and 54(2.01%) late menopausal daughters. The 292 late menopause mothers are showing 85(29.11%) early, 205(70.21%) normal and 2(0.68%) late menopausal daughters. Fig.1. indicates the relationship between menopause age of subjects and their mothers which is negatively related.

4. Discussion

Menopause is a natural event in a woman's life and one cannot postpone or deny this prime challenge. It is a normal degenerative transition associated with aging and loss of fertility[13]. This natural event puts an end to the reproductive cycles in a woman once for all.

Education is treated as one of the decisive and highly influential factor in reproductive behaviour [14]. Reports say an early natural menopause is associated with less education [15-20]. It is true in our study also ($p<0.01$). Earlier studies explained that low socio-economic levels are highly associated with early menopause [2,3,7,18,21]. However, there is no impact of economic status on the age at menopause in our subjects. Studies also indicate that occupational status of women is associated with early menopause [2,3,9,17,21]. Our study too supports this view ($p<0.05$).

One study confirmed that mean age at menopause of rural women was higher than the urban group[10]. But in the present study there are more early menopausal women in rural areas compared to the urban areas. Studies have shown that vegetarian diet [5] and high vegetable intake[6] are found to be associated with early menopause. Our study totally contradicts these findings and there is no positive impact of vegetarian diet on the early age at onset of menopause in our respondents ($p>0.05$). There are controversies against a higher intake of coffee on the age at onset of menopause [7,22]. Our study supports the view of an earlier report, which says there is no association between early menopause and coffee consumption [22].

The present study has confirmed the role of birth control devices, especially copper –T and sterilization on the early age at onset of natural menopause in women. Our study coincides with some studies [8,9] and contradicts with the other studies [23,24). However, there is no impact of oral pills on early age of natural menopause in our subjects.

Earlier reports have shown an association between mothers' and daughters' age at menopause [1,25]. Other studies have shown that the variation in menopause age by the role played by heridity varied from 30 to 85% [26-29]. In the present study the mean menopause age of the subjects is 47.28±4.5 while it is 51.08±3.5 in their mothers. The early onset of natural menopause is more in our subjects than their mothers. Fig.1. indicates the relationship between menopause age of the subjects and their mothers which is negatively related.

It is quite obvious that the natural atrophy of the reproductive organs shuts the reproductive window of a normal woman through the cessation of menstrual cycle in her later ages. If the age of onset of menopause is hereditary, then the reproductive age of all women should be uniform through the Ages. If it is environmentally controlled, all the inhabitants in an area should have the same reproductive age. If it is nutritional, then all the healthy women should have the same reproductive age and malnourished should possess similar reproductive age. But in real life it is totally different even among the mothers and their daughters.

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If it is so who is the culprit of this biological transformation in women's life? A gradual decrease in magnitude or extent in the structural and functional aspects of the reproductive organs totally upset the later reproductive period of women (Fig.2).

Undoubtedly the waning of an individual's reproductive organs due to the age related slow down of endocrine systems shut down the menstrual cycle and creates a stage of reproductive disability in women called the "menopause" which is explained by "waning hypothesis", the main outcome of the present study.

5. Conclusion

Menopause, the unavoidable prime transitional phase totally change the quality of life of women in their later period. The role of heriditary link to the age at onset of menopause in daughters are ruled out beyond doubt through the present study. Moreover the role of various causative factors on menopause transition is not uniform in different populations. Elaborate large scale studies related to the various factors on menopause age are imminent, to address it to the global women.

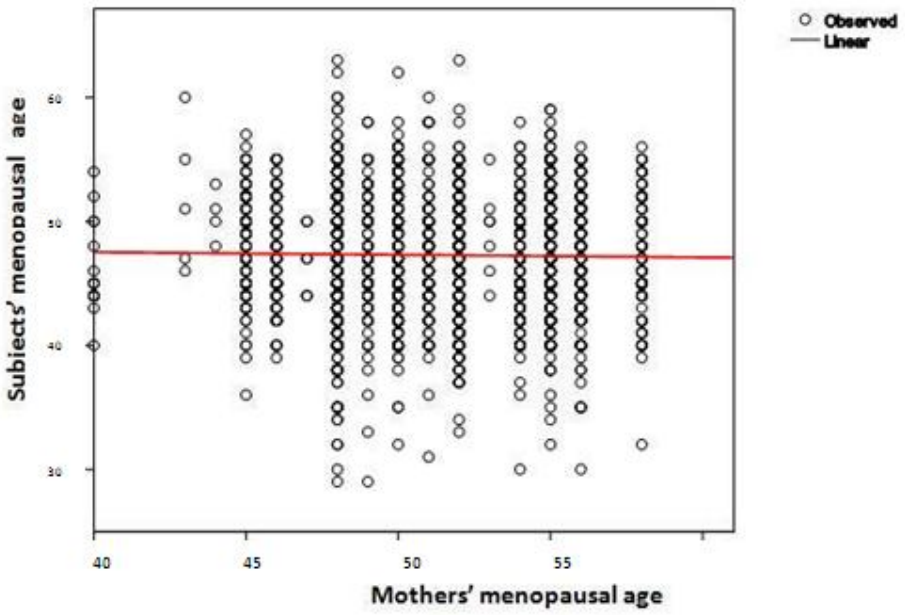

Fig.1. shows menopausal age of the subjects' and their mothers'.

Subject's menopausal age (y) = 48.356 - 0.021 mother's menopausal age(x)

$$y = 48.356 - 0.021\,x$$

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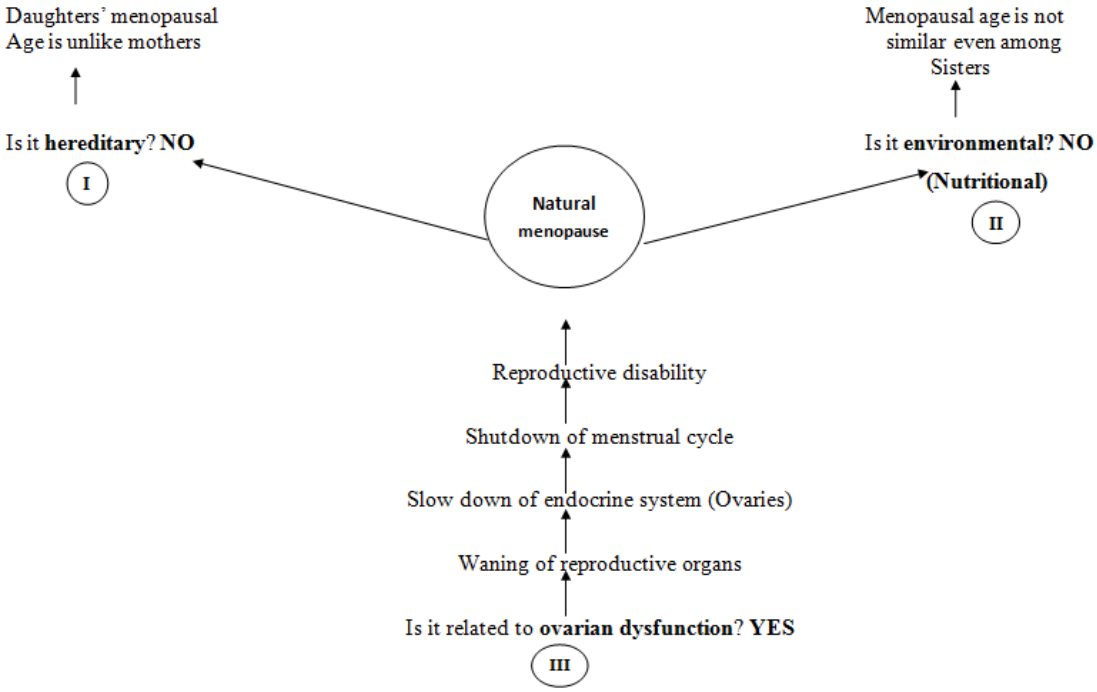

Fig. 2. Waning hypothesis explains the possible cause (s) of natural menopause in women.

Table.1. explains some of the socio-economic criteria on menopause.

(n = 3000 subjects)

Parameters	Menopausal age (yrs)			Total
	Early (29-44)	Normal (45-55)	Late (56-63)	
1. Education				
a. Illiterates	8(11.11)	59(81.95)	5(6.94)	72(2.4)
b. Low	784(26.94)	2074(71.27)	52(1.79)	2910(97)
c. High	5(27.78)	13(72.22)	-	18(0.6)
2. Profession				
a. House wife	713(27.21)	1857(70.88)	50(1.91)	2620(87.33)
b. Private sector employee	35(26.32)	97(72.93)	1(0.75)	133(4.43)
c. Govt. employee	14(21.54)	48(73.85)	3(4.62)	65(2.17)
d. Coolie	35(19.23)	144(79.12)	3(1.65)	182(6.07)
3. Economic status				
a. Poor class	113(19.48)	455(78.45)	12(2.07)	580(19.33)
b. Middle class	613(29.82)	1408(68.48)	35(1.7)	2056(68.53)
c. Upper class	71(19.5)	283(77.75)	10(2.75)	364(12.13)

(Figures in parentheses are percentage values)

χ^2 test : educational status vs menopausal age ($p < 0.01$) professional status vs menopausal age ($p<0.05$)

Twoway ANOVA : economic status vs menopausal age ($p<0.05$)

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Table.2. denotes some of the selected parameters on menopause.

(n = 3000 subjects)

Characteristics	Menopausal age (yrs)			Total
	Early (29-44)	Normal (45-55)	Late (56-63)	
1. Habitat(s)				
a. Urban	173(15.86)	903(82.77)	15(1.37)	1091(36.37)
b. Rural	624(32.69)	1243(65.11)	42(2.2)	1909(63.63)
2. Diet				
a. Vegan	4(16.67)	19(79.17)	1(4.17)	24(0.8)
b. Mixed	793(26.65)	2127(71.47)	56(1.88)	2976(99.2)
3. Coffee				
a. User	115(20.1)	442(77.27)	15(2.62)	572(19.07)
b. Non user	682(28.09)	1704(70.18)	42(1.73)	2428(80.93)
4. Birth control device				
a. Oral pills	-	9(81.82)	2(18.18)	11(0.37)
b. Copper T	37(52.86)	33(47.14)	-	70(2.33)
c. Tubectomy	648(42.91)	862(57.09)	-	1510(50.33)
d. Non-users	112(7.95)	1242(88.15)	55(3.9)	1409(46.97)

(Figures in parentheses are percentage values)

χ^2 test : habitats vs menopausal age : $p < 0.01$ (significant); coffee vs menopausal age : $p < 0.01$ diet vs menopausal age : $p>0.05$ (not significant) ; birth control devices vs menopuasal age : $p < 0.01$

Table.3. indicates the mothers' and the subjects' menopausal ages.

(n = 3000 subjects + 3000 mothers)

Mothers' menopausal age (yrs)	Subjects' menopausal age (yrs)			Total
	Early (29-44)	Normal (45-55)	Late (56-63)	
Early (29-44)	7(28)	17(68)	1(4)	25(0.83)
Normal (45-55)	705(26.28)	1924(71.71)	54(2.01)	2683(89.43)
Late (56-63)	85(29.11)	205(70.21)	2(0.68)	292(9.74)
Total	**797(26.57)**	**2146(71.53)**	**57(1.9)**	**3000(100)**

(Figures in parentheses are percentage values)

χ^2 test : mothers' vs subjects' menopausal age : $p>0.05$ (not significant

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