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Trend and Differentials of Age at Menopause and its Association with Anaemia

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Abstract

Menopause is the permanent cessation of menstruation and difficult to identify the exact age at which menopause occurs, since it happens gradually and even post menopausal female do not remember the correct age at menopause. In fact, paying attention to age at menopause and the factors affecting it in Uttar Pradesh, India, will help us in promoting female's health as early menopause increases risk of cardiovascular diseases and osteoporosis, and late menopause increases risk of breast and endometrial cancer. In the present study an attempt has been made to observe the level of menopause and determine of age at menopause over the time by using NFHS-I and III data. Menopause occurs significantly late in anemic (30 percent less) and contraceptive users (61 percent less) but it is significantly occur early in alcoholic (49 percent more) and underweight females (47 percent more).

Keywords: 1 Anaemia,2 menopause,3 logistic regression,4 NFHS.

Introduction

The female reproductive process is a continuous process, starts in early age of female's life with onset of menarche and gradually leading to its final stage, i.e. menopause. Menopause is the permanent cessation of menstruation resulting from the loss of follicular activity of the ovaries. It is a stage when the menstrual cycle stops for longer than 12 months and there is a drop in the levels of estrogens and progesterone, the two most important hormones in the female body (World Health Organization [WHO], 1996). The reproductive career of a female starts with menarche, that is the onset of the first menstruation and remain continued till menopause. Thus menopause signals the definite end of potential reproductive age of female. Therefore menopausal process is an important time in a female's life since the

onset of this physiological development not only marks the end of female's reproductive function but also introduces them to a new phase of life.

Also her body goes through several changes during this process that can also affect her social life. These changes in females are traditionally indicated by the permanent or gradual stopping of regular monthly menstruation. Due to the random nature of occurrence of menopause it is very difficult to determine a certain age for menopause. The signs and effects of the menopause begin as early as age 30s and most of the females become menopausal during their mid to late 40s. Before menarche and beyond menopause one cannot think about the fertility because of infecudability, hence the ages at these points are important issue for the evaluation of fertility of the females. According to worldwide estimates the median age at menopause range from 45 to 55 years (Biri et. al. 2005; Kaufert & Syrotuik, 1981; Kaw et. al. 1994; Ku et al., 2004; Meschia et al., 2000; Mohammadm et. al. 2004; Sidhu & Sidhu, 1987; Syamala & Sivakami, 2005), with females from Western countries having a higher menopausal age compared to females from other parts of the world (Beard, 1976; Holte, 1991; Wright, 1981), however mean age at menopause in India is about 40-45 years.

It is found that menopause age is affected by several factors such as lifestyle, nutrition, weight, genetics etc. because of the fact that menopausal process is directly or indirectly related with these factors. Also several studies have been done to observe the factors affecting menopause age and many controversial hypotheses have been postulated and also confirmed the relation between menopause age and factors such as socio-economic status, month of birth, educational level, environmental condition BMI, ovulation cycle, reproductive characteristics, and genetic factors are significantly related to menopause age (Hajkazemi et. al., 2010). Separated/divorced/widowed females had an earlier menopause than females who were married or were living as married. But use of oral contraceptives and parity were associated with later age at menopause (Ellen B. Gold et. al., 2001).

Therefore to recognize and paying attention towards these factors affecting menopause age is very important, as well as to find out the age at the onset of menopause and the trend of menopausal females in different age groups also very important. In fact, paying attention to age at menopause and the factors affecting it, will help us in promoting female's health as early menopause increases risk of cardiovascular diseases and osteoporosis, and late menopause increases risk of breast and endometrial cancer (Vehid et.al, 2006; Ellen B. Gold et. al., 2001). Singh et al. (2013) found negative relationship in anaemia and menopause as risk of menopause using incidence and prevalence method.

Due to these facts age at the onset of menopause is a popular subject for the research and has generated a number of studies. However in India very few studies have been done on age at menopause. Thus it becomes important to recognize the factors affecting menopause in order to prevent its complications. Furthermore applying appropriate intervention to prevent complications early or late menopause promotes female's life quality and their health level, as

well as decreases the costs of complications of early and late menopause for the family and the society.

Objective

The main objectives of this study are:

- To find out the prevalence and trend of age at menopause.
- To observe the major factors including anaemia that affects the age at menopause.

Data and Methodology

For the purpose of this study data has been taken from National Family Health Survey-3. We have taken a sample of 2506 females between 35-49 years age group from Uttar Pradesh (Uttaranchal included) state. We have selected only currently married and ever married females in our sample. Also we have not included those females in our sample those are either pregnant or sterilized or in post-partum amenorrhoea. Menstrual status of the females was investigated according to 6 age clusters: 35-40, 40-42, 42-44, 44-46, 46-48 and 48-50 years. We have excluded below 35 years aged females because in this age group risk of menopause is very less as compared to succeeding age clusters. Furthermore we have selected some socio demographic factors such age of female, religion, place of residence, chewing tobacco, use of contraceptives, anaemia level, BMI, drinking alcohol, living standard, parity, marital status, marital duration, age of female at first birth to get the effect at age of menopause and also to find out the prevalence due to these factors.

Binary logistic regression (Rutherford and Choe; 1993) has been used to examine the effects of various socio-demographic characteristics on menopausal status of the female. The binary model can be represented as

$$\ln(P/(1-P)) = b_0 + b_1X_1 + b_2X_2 + \ldots\ldots\ldots\ldots\ldots + b_kX_k,$$

where P is the probability of menopausal status of the female and b_0, b_1, b_2, ...,b_k are the regression coefficients and X_1, X_2, ...X_k are the set of covariates at the levels of females and households.

Results and Conclusion

According to results mean age of post menopause is found to be 44.56 years, it is near about the age at menopause in India whereas median age is found as 45.1 years, these results are very similar to previous studies. Table 1 reveals the percentage of post menopausal females according to some socio demographic characteristics. It is found that among the females whose age at first birth is less than 20 years 25.3 percent females are in post menopause while among the females whose age at first birth is equal or above 30 years 18.9 percent females in post menopause. It concludes that as the age of respondent at first birth increases age at menopause also increases. 35.6 percent childless females are found in post menopause while only 23.4 percent females having children are found in post menopause.

Result shows that as the marital duration increases percentage of post menopausal females also increases. It is found that among anaemic females 18.0 percent are in post menopause while among not anaemic females 24.5 percent are found in post menopause. Among the ever contraceptive users 14.5 percent females are in post menopause while among not users 36.5 percent females are in post menopause. It reveals that use of contraceptives delays menopause. Among substance users 30.2 percent females are in post menopause while among not users only 22.3 percent are in post menopause. Among alcohol users 35.7 percent are in post menopause whereas among not users 33.6 percent are in post menopause.

The distribution of post menopausal females according to some socio demographic characteristics within different age groups is shown in Table 2**.** According to this childless female within 35-40 age group are at more risk to be in post menopause as compared to other females having child i.e. 21.7, 6.9 percent respectively. On contrary within 48-50 again childless females are at more risk to be in menopause as compared to other females having child i.e. 100.0, 67.5 percent respectively. Within every age group ever married are at high risk to be in menopause as compared to currently married females except in 40-42 and 48-50 age groups. Whereas anaemic are at less risk to be in menopause as compared to not anaemic females with in every age group except in 35-40 age group . Also within every age group substance and alcohol users are at high risk to be in menopause as compared to not user females respectively. With in every age group it is found that ever uses of contraceptive users are at lower risk to be in menopause as compared to not users.

In regression analyses table 3 shows the results of Univariate Logistic Regression Model to assess the impact of some socio-demographic variables on menopause in females. Female whose age at first birth is 20-30 years, 30+ years are at 37, 57 percent less risk to get menopause respectively as compare to those female whose age at first birth is less than 20 years. Childless females are at 29 percent higher risk to get menopause as compare to females having child. Widowed/divorced/not living together females are found at 70 percent higher risk to get menopause as compare to currently married females. Females using tobacco, alcohol are at 48, 35 percent higher risk to get menopause as compare to non-users respectively. Underweight, overweight females are at 47, 3 percent higher risk to get menopause as compare to normal females respectively. Contraceptive users (ever used) are found at 62 percent lower risk to get menopause as compare to non-users. It is observed that as the age increases risk to get menopause increases. Anemic females are at 30 percent lower risk to get menopause as compared to non-anemic females.

Table 4 shows the results of Multivariate Logistic Regression Model to assess the impact of Anemia on menopause in females after controlling some socio-demographic variables. Female whose age at first birth is 20-30 yrs, 30+ yrs are at 47, 78 percent less risk to get menopause as compare to those female whose age at first birth is less than 20 yrs respectively. Females using tobacco, alcohol are at 16, 17 percent higher risk to get menopause as compare to non-users respectively. Underweight, overweight females are at 48,

1 percent higher risk to get menopause as compare to normal females respectively. Contraceptive users (ever used) are at 54 percent lower risk to get menopause as compare to non-users. As the age increases risk to get menopause increases. Widowed/divorced/not living together females are at 6 percent higher risk to get menopause as compare to currently married females. After the inclusion of the variable anemia slight changes are observed in the covariates on the risk of menopause. It is also evident from Table 6 that -2log likelihood of Model-II is smaller among the Models, which indicate that it provides better explanation of the data.

Table 5 shows the results of multivariate logistic regression model to assess the impact of Anemia on menopause in females after controlling some socio-demographic variables. Childless females are at 6 percent higher risk to get menopause as compare to females having child. Widowed/divorced/not living together females are at 11 percent higher risk to get menopause as compare to currently married females. Females using tobacco, alcohol are at 22, 14 percent higher risk to get menopause as compare to non-users respectively. Underweight, overweight females are at 46, 0.004 percent higher risk to get menopause as compare to normal females respectively. Contraceptive users (ever used) are at 54 percent lower risk to get menopause as compare to non-users. It is observed that menopause delays in anemic females. After the inclusion of the variable anemia again slight changes are observed in the covariates on the risk of menopause. Whereas it is also evident from Table 5 that -2log likelihood of Model-II is smaller among the Models, which signify that it provides better explanation of the data.

In Uttar Pradesh 50 percent females below age 45 years are in post menopause. Age of respondent at first birth plays an important role in achieving menopause age. It is found that age of respondent at first birth is directly proportional to age at menopause. Females having no child are at more risk to get early menopause as compared to females having children. Widowed/divorcee/not living together females (sexually inactive) are found at more risk to get early menopause as compared to married females. Underweight females are at higher risks to get early menopause as compared to normal females. Use of contraceptives delays the occurrence of menopause. An interesting result is found that anaemic females are at less risk to get menopause as compared to not anaemic.

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***Table 1 - Distribution of Post Menopausal females in different age groups of Uttar Pradesh*.**

Age group	NFHS-I			NFHS-III		
	Menstruating	Post Menopausal	Total	Menstruating	Post Menopausal	Total
35-40	1385	65	1450	1015	79	1094
40-42	418	55	473	301	69	370
42-44	326	105	431	253	82	335
44-46	271	165	436	170	115	285
46-48	160	218	378	110	109	219
48-50	95	243	338	64	139	203
Total	2655	851	3506	1913	593	2506
Mean	**45.58**			**44.56**		

Table 2 - Proportion Menopausal in different age groups of Uttar Pradesh.

age group	Proportion Menopausal	
	NFHS-I	NFHS-III
35-40	0.04	0.07
40-42	0.12	0.19
42-44	0.24	0.24
44-46	0.38	0.40
46-48	0.58	0.50
48-50	0.72	0.68

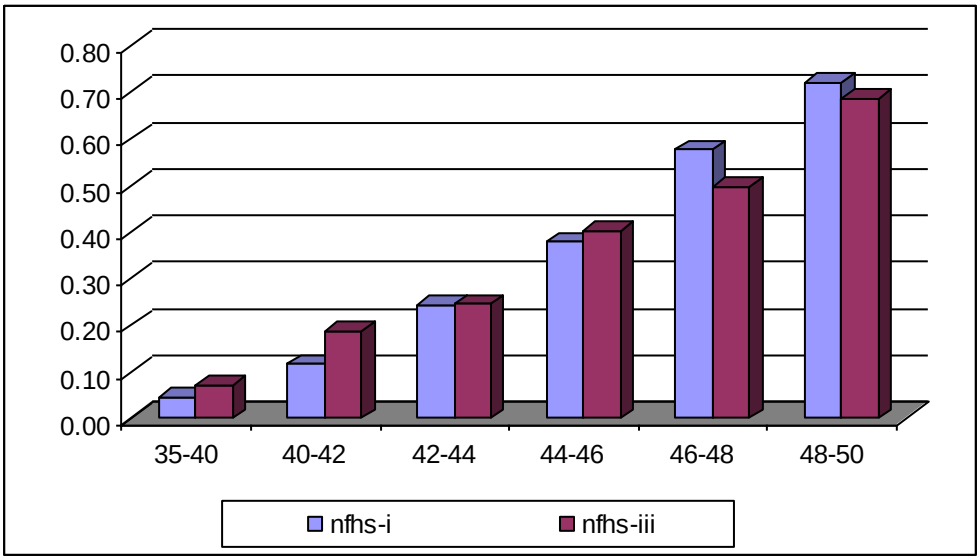

Table 3: Distribution of post menopausal females according to some socio demographic characteristics

Characteristics	Regularly menstruating	Post menopausal	Total
Age of respondent at first birth(excluded childless females)**			
<20	74.7(1115)	25.3(377)	61.0(1492)
20-30	79.5(730)	20.5(188)	37.5(918)
30+	81.1(30)	18.9(7)	1.5(37)
Total	**76.6(1875)**	**23.4(572)**	**100(2447)**
Parity			
Having children	76.6(1875)	23.4(572)	97.6(2447)
Childless	64.4(38)	35.6(21)	2.4(59)
Married			
Currently married	77.3(1787)	22.7(525)	92.3(2312)
Ever married	64.9(126)	35.1(68)	7.7(194)
Marital duration			
<14	97.1(132)	2.9(4)	5.4(136)
15-19	94.6(486)	5.4(28)	20.5(514)
20-24	84.0(741)	16.0(141)	35.2(882)
25-29	67.1(429)	32.9(210)	25.5(639)
30+	37.3(125)	62.7(210)	13.4(335)
Anaemia level			
Not anaemic	75.5(1649)	24.5(535)	87.2(2184)
anaemic	82.0(264)	18.0(58)	12.8(322)
Religion			
Non-Hindu	76.0(418)	24.0(132)	21.9(550)
Hindu	76.4(1495)	23.6(461)	78.1(1956)
Body mass index			
Underweight	72.3(476)	27.7(182)	26.3(658)
Normal	77.9(733)	22.1(208)	37.5(941)
Overweight	77.6(704)	22.4(203)	36.2(907)
Use of contraceptive			
No	63.5(662)	36.5(381)	41.6(1043)
Yes	85.5(1251)	14.5(212)	58.4(1463)
Substance use			
No	77.7(1605)	22.3(460)	82.4(2065)
Yes	69.8(308)	30.2(133)	17.6(441)
Standard of living index			
Low	76.4(391)	23.6(121)	20.4(512)
Medium	75.6(582)	24.4(188)	30.7(770)
High	76.8(940)	23.2(284)	48.8(1224)
Place of residence			
Urban	76.5(1127)	23.5(347)	58.8(1474)
Rural	76.2(786)	23.8(246)	41.2(1032)
Total	**76.3(1913)**	**23.7(593)**	**100(2506)**

Table 4: Distribution of post menopausal females according to some socio demographic characteristics in different age groups

Characteristics	Age group					
	35-40	**40-42**	**42-44**	**44-46**	**46-48**	**48-50**
Age of respondent at first birth(excluded childless females)**						
<20	7.8(54)	24.7(55)	29.2(56)	42.1(69)	56.0(65)	72.2(78)
20-30	5.4(20)	8.6(12)	18.9(24)	35.8(38)	43.6(41)	63.9(53)
30+	0.0(0)	66.7(2)	0.0(0)	50.0(2)	33.3(1)	33.3(2)
Parity						
Having children	6.9(74)	18.9(69)	24.5(80)	39.8(109)	50.2(107)	67.5(133)
childless	21.7(5)	0.0(0)	25.0(2)	54.5(6)	33.3(2)	100.0(6)
Marital status						
Currently married	7.1(73)	18.9(66)	23.7(73)	38.8(99)	48.7(93)	69.5(121)
Ever married	10.2(6)	14.3(3)	33.3(9)	53.3(16)	57.1(16)	62.1(18)
Marital duration						
<14	2.5(3)	9.1(1)	0.0(0)	--	--	--
15-19	5.4(24)	4.7(2)	6.2(1)	16.7(1)	0.0(0)	0.0(0)
20-24	10.2(50)	19.6(39)	22.4(28)	35.4(17)	16.7(2)	83.3(5)
25-29	5.6(2)	22.8(26)	27.3(47)	37.6(62)	40.4(40)	62.3(33)
30+	0.0(0)	33.3(1)	37.5(6)	53.0(35)	63.8(67)	70.6(101)
Anaemia level						
Not anaemic	7.0(66)	20.1(65)	26.5(76)	40.6(104)	50.0(96)	69.9(128)
Anaemic	8.7(13)	8.5(4)	12.5(6)	37.9(11)	44.8(13)	55.0(11)
Substance use						
No	6.2(58)	17.4(52)	23.6(66)	39.2(87)	48.8(83)	69.1(114)
Yes	12.7(21)	23.9(17)	29.1(16)	44.4(28)	53.1(26)	65.8(25)
Standard of living index						
Low	8.3(20)	18.5(12)	31.2(20)	40.6(26)	45.8(22)	67.7(21)
Medium	7.2(26)	24.0(24)	22.9(25)	43.7(38)	58.8(40)	74.5(35)
High	6.7(33)	16.1(33)	22.8(37)	38.1(51)	45.6(47)	66.4(83)
Place of residence						
Rural	6.1(40)	21.3(44)	26.2(50)	38.5(65)	51.4(74)	66.1(74)
Urban	8.8(39)	15.3(25)	22.2(32)	43.1(50)	46.7(35)	71.4(65)
Religion						
Non-Hindu	9.1(24)	20.8(15)	22.1(15)	45.8(27)	47.6(20)	68.9(31)
Hindu	6.6(55)	18.1(54)	25.1(67)	38.9(88)	50.3(89)	68.4(108)
Body mass index						
Underweight	10.1(30)	24.7(24)	29.6(24)	50.6(39)	59.3(32)	62.3(33)
Normal	6.0(26)	15.2(19)	25.0(33)	37.4(37)	52.9(46)	73.4(47)
Overweight	6.3(23)	17.6(26)	20.5(25)	35.8(39)	39.7(31)	68.6(59)
Use of contraceptive						
No	11.7(43)	33.6(45)	36.4(52)	52.3(80)	58.2(71)	72.6(90)
Yes	5.0(36)	10.2(24)	15.6(30)	26.5(35)	39.2(38)	62.0(49)

Table 5: Univariate logistic regression analysis to access the influence of some socio demographic characteristics on risk of menopause among females

Characteristics	Odds ratio	p-value	95% confidence interval	
			lower	Upper
Age of respondent at first birth[1]				
20-30	0.638	0.00	0.554	0.735
30+	0.435	0.01	0.229	0.826
Parity[2]				
Childless	1.297	0.09	0.956	1.758
Marital status[3]				
Ever married	1.705	0.00	1.413	2.058
Anaemia level[4]				
Anaemic	0.708	0.00	0.586	0.855
Religion[5]				
Hindu	1.174	0.05	1.000	1.378
Substance user[6]				
Yes	1.486	0.00	1.278	1.728
Place of residence[7]				
Rural	1.129	0.07	0.992	1.284
Body mass index[8]				
Underweight	1.471	0.00	1.267	1.708
Overweight	1.031	0.70	0.882	1.204
Contraceptive user[9]				
Yes	0.389	0.00	0.341	0.445

Reference category: 1: <20 years2: Having children 3: Currently married 4: Not anaemic 5: Non- Hindu 6: No 7: Urban 8: Normal 9: No.

Table 6: Multivariate logistic regression analysis to access the influence of some socio demographic characteristics on risk of menopause among females

Characteristics	Model-I			Model-II		
	Odds Ratio	95% confidence interval		Odds Ratio	95% confidence interval	
		Lower	Upper		Lower	Upper
Age of respondent at first birth[1]						
20-30	0.799	0.647	0.986	0.798	0.646	0.985
30+	0.559	0.238	1.012	0.572	0.243	0.862
Marital status[2]						
Ever married	1.236	0.883	1.730	1.239	0.884	1.736
Body mass index[3]						
Underweight	1.199	0.969	1.532	1.211	1.047	1.549
Overweight	1.175	0.920	1.501	1.134	0.887	1.450
Religion[4]						
Hindu	1.183	0.927	1.510	1.208	0.945	1.543
Use of contraceptive[5]						
Ever used	0.285	0.232	0.351	0.280	0.227	0.345
Substance use[6]						
Yes	1.414	1.103	1.813	1.441	1.122	1.849
Place of residence[7]						
Urban	1.448	1.155	1.815	1.458	1.162	1.830
Anaemia level[8]						
Anaemic	--	--	--	0.582	0.424	0.798
-2 Log Likelihood	**2477.128**			**2304.998**		

Reference category: 1: <20 years 2: Currently married 3: Normal 4: Non-Hindu 5: Never used 6: No 7: Rural 8: Not anaemic.