
Age at Natural Menopause and Factors Influencing its Timing in a Sample of Iraqi Women In Baghdad.

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Abstract:

Aim of the study: This study was an attempt to determine the age at natural menopause and factors influencing its timing in a sample of Iraqi women in Baghdad.

Subjects & Methods: This cross-sectional study was conducted during the period extending from 12th of November 2006 to the 1st of April 2007. Five hundred women with age range of 46-57 years were included in the study. The data were collected by direct interview using a questionnaire which was constructed to collect information about some sociodemographic, reproductive and lifestyle variables, weight and height were measured for each woman and the body mass index was calculated.

The study was carried out in Al-Sadder general hospital (Al-Qadisiya hospital), Fatema Al-Zahraa hospital (Al-Habibiya hospital) and Al-Rafidain bank/main branch in Baghdad.

Results: The result of the study shows that the mean age at menopause was 47.96 years and the median was 48 years. Out of the 500 women who represent the whole sample, 210 (42%) of them were at natural menopause. About three quarters (79%) of the sample were either illiterate or had elementary education. Regarding the relation of socioeconomic status to the age at menopause, educational level and occupational status of both women and their husbands were significantly associated with age at menopause. Concerning the relation of some reproductive characteristics to the age at menopause, the study shows that the mean age at menopause for nullipara and grandmultipara were later than those women with 1- 4 children (47.4±3.7, 48.3± 4.0 and 45.7± 4.3 respectively) and these differences were statistically significant. All other variables (such as marital status, handedness, body mass index, age at menarche, and regularity of period, didn't show significant relation with age at menopause.

Conclusion: Average age of Menopause was 47.96 years. Socioeconomic status, educational level occupational status, and parity were statistically associated with age of Menopause

Key Words: Menopause, Average age

Introduction:

Menopause is an important stage in the life of every woman, although menopause, as a major event affecting the reproductive system, is usually included as an extraneous variable in research studies, little is known from reliable studies about epidemiology of the event itself as an independent variable^[1].

Age at which natural menopause occurs range from of 45 and 55 years for women worldwide. It is generally accepted that the average age at menopause is about 51 years in industrialized countries, but data are inconsistent for the developing world because of methodological problems^[2].

Menopausal age influences risk for death and many serious illnesses in women^[3]. Factors delaying menopause may postpone the development of postmenopausal medical conditions such as cardiovascular disorder and osteoporosis, but may increase the risk of endometrial and breast cancer^[4,5]. The connection of menopausal age with risk factors for such medical conditions makes age at menopause an important epidemiological issue^[6].

The aim of the current study is to determine the average age at natural menopause and factors

associated with the timing of menopause in a sample of Iraqi women in Baghdad.

Subjects & Methods

A cross-sectional study with an analytic element was designed and carried out.

Two hospitals and one main bank were included in the study these were; Al-Sadder general hospital (Al-Qadisiya hospital), Fatema Al-Zahraa hospital (Al-Habibiya hospital) [both hospitals from Al-Rusafa Health Directorate] and Al-Rafidain bank/main branch in Al-Rusafa area (Al-Rafidain bank was chosen because a good number of employed and educated women could be found).

The study was conducted during the period between 12th of November 2006 and the 1st of April 2007

The data for this study was collected from 500 women; 230 from Al-Sadder hospital, 200 from Fatema Al-Zahraa hospital and 70 women from Rafidain bank.

Women age 46-57 years old, being sure of their ages: asking the woman about her real age (and not necessarily what was written in the birth certificate because some birth certificates are inaccurate in Iraq especially for those women who were born in countryside) and sometimes from the

information provided by the husband or other close relatives.

Women who had hysterectomy, women who underwent radiotherapy or chemotherapy prior to menopausal age were excluded.

The data was collected using an interviewing questionnaire.

Each woman that met the inclusion criteria was interviewed, before the interview, the aim of the study was explained, the permission of the participants was sought, privacy was taken into consideration.

The anthropometric measurement used in this research includes weight and height to calculate the body mass index:

-Weight: It was measured by using the UNICEF electronic scale 890 (Seca, Australia). The weight of the woman was measured to the nearest 0.5 Kg taken with their clothing but with out shoes.

-Height: It was measured using a tape measures and headboard (Seca, Australia). The height was measured to the nearest millimeter with the woman standing on a flat surface erect against a wall (without shoes).

The Body Mass Index (BMI) is calculated according to the formula:

$$\text{BMI} = \text{weight (kg)} / (\text{Height in meter})^2$$

The investigators used international classification adapted by WHO to classify women to underweight, normal, overweight and obese^[7].

- <18.5 (underweight)
- 18.5-24.9 (normal)
- 25-29.9 (overweight)
- ≥30 (obese)

Statistical Analysis:-

Simple descriptive statistics (Frequency, mean, standard deviation and percentage) was used. Analysis of variance (ANOVA test) was used for comparisons between means of variables with more than two groups. Chi square test (X^2) was used to detect association between variables. P value less than 0.05 was considered statistically significant.

Results

Out of 500 women who represent the whole sample, 210 (42%) of them were menopausal. The age range for the whole sample was 46-57 years, the youngest woman who experienced natural menopause was at age 34 years and the oldest one experienced it at age 56 years, 2.4% of menopausal women had premature menopause.

The mean age at menopause for the menopausal women was (47.96 ± 4.2) years and the median age was 48 years.

As shown in table(1), the mean age at menopause increased with increasing age, the differences in the mean age at menopause were statistically significant ($P=0.0001$) (Table 1).

Concerning the marital status, results show that about two thirds of the women (69.8%) were currently married and 58.9% of them had consanguineous marriage. There were no significant differences in the mean age at menopause between menopausal women with different marital status or between those with consanguineous and non-consanguineous marriage (Table 1).

The current study shows that 92.4% of the women were right handed and no significant differences in the mean age at menopause were found between right and left handed women ($p=0.504$). (Table 1)

Table 1. Women characteristics and their relation to age at menopause.

	Total Sample		Menopausal		Age at menopause Mean±SD (Median)	F value (or Z value); P value
	No.	%	No.	%		
Age groups (year)						
46-47	103	20.6	10	9.7	43.4±2.2(44.0)	F=12.7; P=0.0001*
48-49	83	16.6	15	18.1	44.1±3.9(46.0)	
50-51	106	21.2	38	35.8	46.6±3.1(47.0)	
52-53	79	15.8	42	53.2	47.3±3.8(48.0)	
54-55	72	14.4	54	75.0	49.1±3.4(50.0)	
56-57	57	11.4	51	89.5	50.3±4.4(52.0)	
Total	500	100	210			
Marital status						
Single	21	4.2	5	23.8	48.4±7.1(50.0)	F=1.013; P=0.388
Married	349	69.8	151	43.3	48.1±4.1(49.0)	
Divorced or Separated	21	4.2	12	57.1	45.9±4.9(45.5)	
Widowed	109	21.8	42	38.5	48.0±4.0(48.0)	
Total	500	100	210			
Consanguinity**						
Not relative	197	41.1	75	38.1	47.9±4.1(48.0)	Z=0.004; P=0.996
Relative	282	58.9	130	46.1	48±4.2(48.0)	
Total	479	100	205			
Handedness						
Right handed	462	92.4	199	43.1	48.1±4.2(48.5)	F=0.688; P=0.504
Left handed	27	5.4	8	29.6	46.2±3.7(46.5)	
Both	11	2.2	3	27.3	49.0±2.0(49.0)	
Total	500	100	210			

*Significant difference

** 21 women (from the whole sample) were unmarried, 5 menopausal women were unmarried

The distribution of the sample according to education and occupation of women and their husbands is shown in (table 2), women educational level was significantly associated with age at menopause ($\chi^2=16.226$; $P=0.001$). More than three quarters of the women (79.4%) were unemployed (housewives) and slightly less than half (45.6%) of those unemployed women were menopausal, women occupation was significantly associated with age at menopause (table 2), educational level and occupational status of the husbands were significantly associated with age at menopause ($\chi^2=10.664$; $P=0.014$, $\chi^2=6.192$; $P=0.045$ respectively) (table 2).

The result in (table 3) shows that more than half of the sample (58.8%) was obese and (40.4%) of the obese were menopausal. BMI was not related to age at menopause ($P=0.758$).

The mean age at menopause and the distribution of the sample according to some reproductive characteristics is shown in table 4. As shown in the table, the age at menopause for grandmultipara was (48.3±4.0) years, for nullipara was (47.4±3.7) years while for those women with 1-4 children was (45.7±4.3) years, these differences in the mean age at menopause were statistically significant ($P=0.007$). The same was true for gravidity; women who had five or more

pregnancies and women who never conceived or had a baby had a later menopause than those with

1-4 pregnancies. The differences were statistically significant (P=0.003) (table 4).

Table 2. The distribution of the sample according to education and occupation of the women and their husbands.

	Total Sample		Menopausal		χ^2 ; P value
	No.	%	No.	%	
Woman educational level					
Illiterate (0)	217	43.4	108	49.8	$\chi^2=16.226$; P=0.001*
Elementary (1-6)	178	35.6	74	41.6	
Secondary school (7-12)	64	12.8	15	23.4	
High school (13+)	41	8.2	13	31.7	
Total	500	100	210		
Husband educational level**					
Illiterate (0)	80	16.7	46	57.5	$\chi^2=10.664$; P=0.014*
Elementary (1-6)	198	41.3	85	42.9	
Secondary school (7-12)	148	30.9	57	38.5	
High school (13+)	53	11.1	17	32.1	
Total	479	100	205		
Woman occupation					
Unemployed	397	79.4	181	45.6	$\chi^2=11.459$; P=0.003*
Employed	99	19.8	27	27.3	
Retired	4	0.8	2	50.0	
Total	500	100	210		
Husband occupation**					
Unemployed	66	13.8	35	53	$\chi^2=6.192$; P=0.045*
Employed	250	52.2	93	37.2	
Retired	163	34.0	77	47.2	
Total	479	100	205		

* Significant

**21 women (from the whole sample) were unmarried, 5 menopausal women were unmarried

Table 3. The distribution of the sample and mean age at menopause according to BMI

	Total Sample		Menopausal		Age at menopause Mean±SD (Median)	F value; P value
	No.	%	No.	%		
BMI						
<18.5 (underweight)	1	0.2	-	-	-	F=0.277; P=0.758
18.5-24.9 (normal)	54	10.8	29	53.7	48.1±4.6(50.0)	
25-29.9(overweight)	151	30.2	61	40.4	47.6±4.0(48.0)	
≥30 (obese)	294	58.8	120	40.8	48.1±4.2(48.0)	
Total	500	100	210			

Table 4. The distribution of the sample and mean age at menopause according to some reproductive characteristics.

	Total Sample		Menopausal		Age at menopause Mean±SD (Median)	F value; P value
	No	%	No	%		
Age at menarche**						
9-12	116	28.1	46	39.7	48.1±4.5(48.5)	F=0.110 ; P=0.896
13-15	262	63.4	111	42.4	47.8±4.3(48.0)	
16+	35	8.5	14	40.0	48.1±4.5(49.5)	
Total	413	100	171			
Age at first marriage***						
<20	326	68.1	147	45.1	48.0±4.0(48.0)	F=0.567 ; P=0.687
20-24	104	21.7	35	33.7	48.3±4.6(50.0)	
25-29	27	5.6	16	59.3	47.8±4.6(48.0)	
≥30	22	4.6	7	31.8	45.7±3.5(45.0)	
Total	479	100	205			
Gravidity***						
0	20	4.2	7	35.0	48.7±2.5(49.0)	F=6.168 ; P=0.003 *
1-4	67	14.0	25	37.3	45.2±4.6(46.0)	
5+	392	81.8	173	44.1	48.2±4.0(49.0)	
Total	479	100	205			
Parity***						
0	23	4.8	10	43.5	47.4±3.7(48.0)	F=5.109 ; P=0.007 *
1-4	82	17.1	31	37.8	45.7±4.3(46.5)	
5+	374	78.1	164	43.9	48.3±4.0(49.0)	
Total	479	100	205			
Abortion***						
0	237	49.5	96	40.5	47.9±4.5(48.0)	F=0.187 ;P=0.83 0
1-3	218	45.5	95	43.6	47.9±3.8(48.0)	
4+	24	5.0	14	58.3	48.6±4.3(50.0)	
Total	479	100	205			
Age at first live birth****						
<20	246	54.7	111	45.1	47.8±3.8(48.0)	F=2.530 ; P=0.042
20-24	141	31.3	55	39.0	49.2±4.3(50.0)	
25-29	52	11.6	24	46.2	47.3±4.9(48.5)	
≥30	11	2.4	3	27.3	43.3±2.5(43.0)	
Total	450	100	193			
Age at last live birth****						
<20	3	0.7	-	-	-	Z=3.767 ; P=0.000 *
20-35	168	37.3	58	34.5	46.4±4.4(47.0)	
>35	279	62.0	135	48.4	48.8±3.8(49.0)	
Total	450	100	193			

*Significant difference.

** 87 women gave no response (couldn't remember their age at menarche).

*** 21 women (from the whole sample) were unmarried, 5 menopausal women were unmarried.

**** 50 women were either unmarried or had no live birth baby.

Table (5) shows the distribution of the sample and means age at menopause according to the menstrual characteristic history.

Regarding the pattern of menstrual cessation for the menopausal women, 67 (31.9 %) of menopausal women had entered their menopause

abruptly and their age at menopause was (46.5±4.7) years. The differences in the mean age at menopause between women with different pattern of menstrual cessation were statistically significant (P=0.001) (table 5).

Table 5. The distribution of the sample and mean age at menopause according to the menstrual characteristic history.

	Total Sample		Menopausal		Age at menopause Mean±SD (Median)	F value(or Z value); P value
	No.	%	No.	%		
Regularity of period						
Regular	475	95.0	199	41.9	48.1±4.1(49.0)	Z=1.819; P=0.070
Irregular	25	5.0	11	44.0	45.7±5.5(47.0)	
Total	500	100	210			
Length of menstrual cycle **						
≤ 21	9	1.9	4	44.4	50.3±3.4(51.0)	F=1.034; P=0.358
22-32 days	465	97.9	194	41.7	48.0±4.1(48.0)	
≥33 days	1	0.2	1	100.0	52.0± (52.0)	
Total	475	100	199			
Menstruation bleeding period**						
≤5 days	273	57.5	105	38.5	47.9±4.3(48.5)	Z=0.598; P=0.440
6-8 days	202	42.5	94	46.5	48.3±4.0(48.5)	
Total	475	100	199			
Dysmenorrhoea						
No	267	53.4	111	41.6	48.1±4.2(49.0)	Z=0.699; P=0.485
Yes	233	46.6	99	42.5	47.7±4.2(48.0)	
Total	500	100	210			
Midcycle spotting						
No	499	99.8	210	42.1	47.9±4.2(48.0)	-
Yes	1	0.2	-	-	-	
Total	500	100	210			
Pattern of menstrual cessation						
Abrupt						
Yes	-	-	67	-	46.5±4.7(47.0)	Z=3.36; P=0.001*
No	-	-	143	-	48.6±3.8(49.0)	
Total			210			

*Significant difference

** For those women with regular period only

Discussion:

The current work reveals that the mean age at menopause was 47.96±4.2 years (median 48 years).

This figure is lower than the previous figure reported in Baghdad [8] which was 49.4± 3.2 years and this may be due to different methodologies

used. But it is consistent with many figures reported elsewhere, in Turkey the mean age at menopause reported was 47.8 years^[9], in Al-Khobar- Saudi Arabia was 48.06 years^[10], in Malaysia was 47.96 years^[11].

Early onset of natural menopause is not expected to be more than 1-2% in a community^[12]. The present work shows that 2.8% of menopausal women experienced premature menopause (before the age of 40 years), this could be attributed to stressful conditions that Iraqi women exposed to. Bromberger, (1997) reported that emotional state plays an important role in regulating gonadal function^[13].

In the present work, marital status was not significantly related to the age at menopause and this is in agreement with a study done in Iraq and else where^[8, 14].y few studies try to investigate the effect of consanguinity on the age at menopause, in the present study consanguineous marriage (which represents 58.9% from all marriages) was not related to the age at menopause which is in disagreement with the results of a study done in UAE^[15] and disagree also with an Iranian study done by Ayatollahi et. al., (2005) who both found that women with consanguineous marriage report a later age at menopause ,about one year in the later study^[1].

Left handed women have been reported to experience menopause earlier than right handed women^[16]. Minority of women in the current study (5.4%) where left handed, and no relation between handedness and age at menopause which is in agreement with other worker^[1].

The current study reveals a significant association between age at menopause and both educational level and occupational status of women and their husbands (which were used as indicators of socioeconomic status). Hidayet et. al., reported that education is a strong socioeconomic indicator, and that the age at menopause was positively associated with both level and years of education of the studied women while occupation found to be not related to the age at menopause^[6].

More than half of the women (58.8%) in the current study were obese, no relation was found between BMI and the age at menopause which is consistent with several studies^[8,17] while others found that BMI is related to age at menopause and the greater the BMI, the later the age at menopause, this phenomenon of later age at menopause among obese could be explained by a higher estrogen production in the adipose tissue of obese women^[18].

It was reported that a significant association between the age at menarche and menopause reporting that the earlier the age at menarche, the earlier the menopausal age^[19,20].

About one third of the menopausal women (31.9%) in the present study had entered their menopause abruptly compared with 40% in the

study of Hidayet et al, (1999), 25.5% in the study of Muhammad, (2002) and 44% in the study of Qazi, (2006) (6,8,21). The present study found a significant relation between age at menopause and pattern of menstrual cessation, those women with sudden cessation of menstruation had an early menopause comparing to other menopausal women (46.5±4.7, 48.6±3.8 years respectively) and this finding coincides with the result reported by others^[6,8].

Conclusion:

The average age of menopause was 47.96 years. Socioeconomic status, educational level, occupational status, and parity were statistically associated with age of menopause, while other variables didn't show any significant relation.

References:

- 1-Ayatollahi SMT, Ghaem H, Ayatollahi SAR (2005). Sociodemographic factors and age at natural menopause in Shiraz, Islamic Republic of Iran. *East Mediterranean Health Journal*; 11:146-153
- 2-Sidhu Sh, Kaur A, Sidhu M (2005). Age at menopause in educated women of Amritsar (Punjab). *J. Hum. Ecol.*; 18 (1): 49-51.
- 3-Murabito JM, Yang Q, Fox C, Wilson PWF, Cupples LA (2005). Heritability of age at natural menopause in the Framingham heart study. *The Journal of Clinical Endocrinology & Metabolism*; 90(6): 3427-3430
- 4-Reis N, Pasinlioglu T, Dane S (1998). The Natural menopause age of women in Erzurum and factors influencing the age at menopause. *Tropical J. of Medical Science*; 28:415-418.
- 5-Snieder H., MacGregor AJ, Spector TD (1998). Genes control the cessation of a woman's reproductive life: a twin study of hysterectomy and age at menopause. *J. Clin. Endocrinol. Metab.*; 83(5): 1875-1880.
- 6-Hidayet NM, Sharaf SA, Aref SR, Tawfik TA, Moubarak II (1999). Correlate of age at natural menopause: a community – based study in Alexandria. *Eastern Mediterranean Health Journal*; 5(2):307-319.
- 7-WHO expert consultation (2004). Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *The Lancet*; 157-163. In: WHO (2007). Global database on Body Mass Index. Available from: http://www.who.int/bmi/index.jsp?introPage=intro_3.html
- 8-Muhammed F (2002). Factors related to the determinations of age at natural climacteric and complaints among middle age Iraqi women in Baghdad city. PhD thesis submitted to the College of Nursing, Baghdad University; p: 118-120.

- 9-Neslihan CS, Bilge SA, Ozturk TN, Oya G, Ece O, Hamiyet B (1998). The menopausal age, related factors and climacteric symptoms in Turkish women. *Maturitas*; 30(1):37-40 [Abstract].
- 10-Al-Sejari MM (2005). Age at natural menopause and menopausal symptoms among Saudi Arabian women in Al-Khobar. PhD thesis, Ohio State University.
- 11-Jahanfar Sh, Abdul Rahim BA, Shah Reza BK, Nor Azura BTI, Sharifah Nora. SAD, Siti Asma' AR (2006). Age of menopause and menopausal symptoms among Malaysian women who referred to health clinic in Malaysia. *Shiraz E-Medical Journal*; 79(3):
- 12-Vehid S, Aran SN, Köksal S, Işılolu H, Mustafa Ş (2006). The prevalence and the age at the onset of menopause in Turkish women in rural area. *Saudi Med J*; 27 (9): 1381-1386.
- 13-Bromberger JT, Matthews KA, Kuller LH, Wing RR, Meilahn EN, Plantinga P (1997). Prospective Study of the determinants of age at menopause. *American Journal of Epidemiology*; 145(2): 124-133.
- 14-Brambilla DJ, Mc Kinlay SM (1989). A prospective study of factors affecting age at menopause. *J Clin Epidemiol*; 42; 1031-9.
- 15-Bener A, Rizk DE, Ezimokhai M, Hassan M, Micallef R, Sawaya M (1998). Consanguinity and the age of menopause in the United Arab Emirates. *Int J Gynaecol Obstet.*; 60(2):155-60 [Abstract].
- 16-Dane S, Kumtepe Y, Pasinlioglu T, Aksoy A (2004). Relationship between age of menopause and cell-mediated immune hypersensitivity in right- and left-handed women. *Int J Neurosci.*; 114(5):651-7[Abstract].
- 17-Luoto R, Kaprio J, Uutela A (1994). Age at natural menopause and sociodemographic status in Finland. *American Journal of epidemiology*; 139(1):64–76[Abstract]
- 18-Ortega-Ceballos PA, Morán C, Blanco-Muñoz J, Yunes-Díaz E, Castañeda-Iñiguez MS, Salmerón J (2006). Reproductive and lifestyle factors associated with early menopause in Mexican women. *salud pública de méxico J* ;48(4):300-307
- 19-Kaczmarek M (2005). Intra-population age variation at natural menopause and underlying past reproductive events: a case of Polish women. *Acta Medica Lituanica.*; 12 (1): 15-21.
- 20-Rödström K, Bengtsson C, Milsom I, Lissner L, Sundh V, Bjoürkelund C (2003). Evidence for a secular trend in menopausal age: a population study of women in Gothenburg. *Menopause*; 10(6): 538-43
- 21-Qazi RA (2006). Age, pattern of menopause, climacteric symptoms and associated problems among urban population of Hyderabad, Pakistan. *Journal of the college of physicians and surgeons- Pakistan*; 16 (11): 700-703