Scholars Academic Journal of Biosciences (SAJB) **ISSN 2321-6883 (Online)**
Sch. Acad. J. Biosci., 2014; 2(1): 64-70 **ISSN 2347-9515 (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com **DOI:** 10.36347/sajb.2014.v02i01.012

Research Article

Demographic and Reproductive Characteristics of Menopausal Nigerian Women

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Abstract: This study investigated some demographic and reproductive characteristics associated with menopause among Nigerian women. The eligible population for the study numbered 324. Factors found to associate significantly with the age at menopause are religion, ethnicity, parity and age at marriage (P<0.0001). Other variables that also showed significant association were season of birth, nausea and vomiting of pregnancy (NVP), breastfeeding, contraception, educational level and number of older male siblings (P<0.05). All other variable found no association although age at menopause increased with age at first birth.
Keywords: Menopause, reproductive and demographic factors

INTRODUCTION

The human life experience is rapidly changing and *menopause* is only one aspect *of* this change that affects the female species. The World Health Organization (WHO) in 1981 [1] defined menopause as the permanent cessation of menstruation resulting from loss of ovarian follicular activity which is not induced by any drug, clinical or surgical procedure. In recent times, mans quest to find answers about him has generated a lot of questions one of which is the ultimate cause of menopause since selection pressures have pushed several species to maximize reproductive success rather than optimizing longevity [2]. Williams in 1957 [3]considered menopause as an adaptive mechanism acquired by the human species to minimize the mortality risk associated with childbirth due to reduced antero-posterior dimension of the pelvic in humans as age advanced after they took up a bipedal gait [4, 5]. An earlier study suggested that this adaptation, menopause, took place about six million years ago when the human species parted with their common ancestors; the chimpanzee, *Pan Troglotytes* in particular the Bonobo, *Pan Paniscus* [6]. However, our knowledge on the mechanism underlying menopause has been confined to ovarian exhaustion which begins as a progressive loss of Oocytes from birth.

Anthropological and cross-cultural studies have challenged the concept of menopause as a universal phenomenon with wide variations among women from different ethnic origins living in different countries [7]. These studies also suggests that cultural explanations of these differences need to include lifestyle (diet, exercise, social factors, educational level) as well as reproductive patterns which can affect biological processes [7, 8].

In Nigeria, the average age at menopause was estimated at 49 years which is slightly lower than the typical age of 51 for many developed countries [9]. It has been found that mortality risk for women who had their natural menopause before the age of forty is nearly twice as high as for those who experienced menopause at age 50-54 [10, 11] which may account for the short life expectancy of 47.7 years in Nigerian women [9]. Studies focused on using demographic and reproductive factors as predictors of age at natural menopause have been inconclusive [9, 12]. This study was therefore aimed at investigating factors that are predictors of age at natural menopause among Nigerian women.

METHODS

Subjects for this study were recruited via simple random sampling. The eligible population for this study numbered 324 and constitute menopausal women who came from settlements in Abia, Kaduna, Osun and Rivers States in Nigeria. Factors which influenced data collection from these regions were their willingness to participate, accommodate individuals from varying socio-economic background in addition to ensuring that each geographical area was represented. Women were included in the study if they have attained natural menopause according to WHO definition of 1981, if they are Nigerians without mixed race and have a pure breed for a particular ethnic group in Nigeria. This was determined by tracing their paternal origin up to the second generation. Information required was obtained through standardized questionnaires. Verbal interview of the women was the instrument of data collection to filling out the questionnaires for this study via recall. For some others, questionnaires were distributed to these women to fill out either individually or in group. This study was carried out with due approval from an instituted ethical body and also with the consent of the subjects themselves.

Data Analysis

Data were analysed using Analyse-It for Microsoft excel version 2.22, 2011. Data were presented as descriptive statistics, percentages of Mean ± SD. One way analysis of variance (ANOVA) and student's t-test was used to compare means and determine association between menopause and the variables considered. The level of significance was valued at $P<0.05$ for all analysis.

RESULTS

The descriptive characteristics of the study group are presented on Table 1, 2 and 3. Going by the season of birth, more women were born in the wet season than in the dry season. For those who reported NVP during their reproductive age, 40.90% of these women reported having suffered NVP in one or more pregnancy while 59.10% never had NVP. It was also observed that more women had an early marriage, early child birth and increased parity. When compared with women in the prospective study (gravid women), women in this group had a later menarcheal age of 14.30 ± 1.70 and mean menopausal age (yrs) of the study population was 45.50 ± 3.90.

Some parameters considered for association with menopause are represented on Table 4. There was a significant ($P<0.05$) association between age at menopause and the season of birth as women born in the dry season will have a later menopausal age of about one year when compared to those born in the wet season. Religion was also significantly associated with the age at menopause. Christians were observed to have a later mean menopausal age than their Muslim counterpart ($P<0.0001$). Other variables such as NVP, breastfeeding and the use of contraceptive were also significantly associated with age of menopause. Women who breast fed were observed to have menopausal age about five years later than those that did not breastfeed. No association was observed with handedness.

On Table 5, educational level strongly associated significantly ($P = 0.0006$) with the age at menopause. The level of significance was seen between those who attended other forms of education and those who attended secondary or tertiary education but not with primary. Women who attended post-primary education (secondary and tertiary) have a higher menopausal age than those who attended either primary or other form of non-formal education. The ethnicity of these women was also found to strongly associate significantly ($P <0.0001$) with the age at menopause within the study group. The level of significance was observed between the Hausa women and women from other ethnic groups. Women who were from tribes other than the three major ethnic group had the highest menopausal of about 48 years. Parity and the age at marriage also strongly associated significantly ($P<0.0001$) in a progressive manner with the age of menopause as women who had no child had the least menopausal of 39.3 years while women who had ≥4 children had a later menopausal age of 46.1 years. The level of significance for age at marriage lies between women who married between the ages of 10-15 and 20-24 years and also between those who married between the ages of 15-19 and 25-29 years. Furthermore, the number of elder brother was also found to associate significantly ($P = 0.009$) in a progressive pattern with the age at menopause as menopausal age for women decreased with increase in the number of elder brother but not with elder sisters. There was no association found between length of menstrual flow, age at first birth and age at menarche with age at menopause.

Table 1: Descriptive statistics of demographic characteristics of menopausal women

Parameter	Frequency (%)	n
Birth season		
Dry	102 (39.00)	261
Wet	159 (61.00)	
Educational level		
Tertiary	45 (14.20)	
Secondary	84 (26.70)	316
Primary	57 (18.00)	
Others	130 (41.10)	
Ethnicity		
Hausa	136 (42.00)	
Igbo	79 (24.40)	324
Yoruba	88 (27.20)	
Others	21 (6.50)	
Religion		
Christian	166 (52.20)	324
Muslim	152 (47.80)	
Handedness		
Right	297 (94.30)	315
Left	18 (5.70)	

Table 2: **Descriptive statistics of some reproductive characteristics of menopausal women**

Parameter	Frequency (%)	n
NVP		
Yes	128 (40.90)	313
No	185 (59.10)	
Length of Menstrual flow(days)		
≤3	101 (32.30)	
4-5	176 (56.20)	313
>5	36 (11.50)	
Age at 1st birth (yrs)		
<20	101 (34.00)	
20-25	107 (36.00)	297
26-30	80 (26.90)	
>30	9 (3.00)	
Breast feeding		
Yes	296 (99.00)	299
No	3 (1.00)	
Parity		
1	9 (2.80)	
2	26 (8.00)	
3	40 (12.30)	324
≥4	237 (73.20)	
None	12 (3.70)	
Contraception		
Yes	68 (24.10)	282
No	214 (75.90)	

Table 3: Descriptive statistic of some reproductive characteristics of menopausal women

Parameter (yrs)	n	Mean ± SD	mini	max	Range
Age (yrs)	323	56.70 ± 8.90	40.00	110.00	70.00
Age at menarche	321	14.30 ±1.70	10.00	20.00	10.00
Age at marriage	324	19.60 ± 4.90	10.00	37.00	27.00
Age at menopause	321	45.50 ±3.90	30.00	57.00	27.00

Table 4: Student's t-test for association between menopause and some demographic and reproductive characteristics

Parameter	Mean ± SD	n	t	P
Season of birth				
Dry	46.40 ± 3.70	102	2.48	0.01*
Wet	45.30 ± 3.50	157		
Religion				
Christians	46.70 ± 2.30	164	6.56	<0.0001*
Muslims	44.00 ± 4.70	151		
Handedness				
Right	45.50 ± 3.90	294	0.33	0.74
Left	45.20 ± 3.70	18		
NVP				
Yes	46.10 ± 3.40	127	2.81	0.03*
No	45.20 ± 4.10	183		
Breast feeding				
Yes	45.80 ± 3.60	293	3.07	0.002*
No	39.30 ± 0.60	3		
Contraception				
Yes	46.90 ± 2.40	68	3.20	0.002*
No	45.20 ± 4.20	212		

*P<0.05

Table 5: ANOVA for demographic and reproductive characteristics and menopause

Parameter	Mean ± SD	n	F	P
Educational level				
Tertiary	46.30 ± 2.50	45		
Secondary	46.60 ± 2.50	84	5.91	0.0006*
Primary	45.50 ± 4.90	56		
Others	44.40 ± 4.30	128		
Ethnicity				
Hausa	43.70 ± 4.70	135		
Igbo	46.60 ± 2.30	78	19.39	<0.0001*
Yoruba	46.60 ± 2.60	88		
Others	48.00 ± 2.00	20		
Length of menstrual flow				
≤3days	45.50 ± 3.50	99		
4-5 days	45.50 ± 4.00	175	0.18	0.83
>5days	45.10 ± 4.60	36		
Age at 1st birth				
<20	45.10 ± 4.70	101		
20-25	46.10 ± 2.80	105	2.59	0.05
26-30	46.20 ± 2.40	79		
>30	47.60 ± 3.70	9		
Parity				
None	39.30 ± 4.30	12		
1	43.20 ± 3.60	9		
2	44.00 ± 4.00	25	12.82	<0.0001*
3	44.90 ± 3.60	40		
≥4	46.10 ± 4.30	235		
Age at menarche				
10-12	45.30 ± 5.30	41		
13-15	45.60 ± 3.40	208	0.64	0.59
16-18	45.00 ± 4.30	66		
>18	47.70 ± 4.50	3		
Age at Marriage				
10-15	43.70 ± 5.60	58		
16-20	44.90 ± 4.10	100		
21-25	46.20 ± 2.40	99	6.95	<0.0001*
26-30	46.70 ± 2.30	60		
>30	48.50 ± 4.20	4		
No of elder brothers				
<3	45.60 ± 3.30	166		
3-5	45.30 ± 3.50	38	4.81	0.009*
>5	39.70 ± 1.50	3		
No of elder sisters				
<3	45.80 ± 3.40	155		
3-5	45.40 ± 3.80	29	1.40	0.25
>5	48.20 ± 4.90	5		

*P<0.05

DISCUSSION

Age at menopause

This study reports a mean menopausal age of 45.50 ± 3.90 which is about 4 and 3.1 years lower than that (49 and 48.4 years) reported by Gharoro and Igbafe [13] and Frederic *et al*. [14]. Unfortunately, while the developed countries record an increase in menopausal age [15], there seem to be a decrease among Nigerian women. This may not be unconnected to the increased poverty rate and high stress level. It has been shown that stress, exercise and strenuous activities affect the production of sex hormone by interfering with hormonal levels or it's the pathway via production of excessive cortisol at the expense of the sex hormone to cope with stress [16, 17].

Menopause and socio-demographic characteristics

Season of birth was found to be significantly (P <0.05) associated with the age at menopause. Women born in dry season has a significant higher age at menopause of about 1.1 years than those born in the wet season. Similar result was reported by Cagnacci *et al.* [18] but contrasting to the findings of Smits *et al*. [19] and Huber *et al*. [20]. This has been linked to prenatal

development and Seasonal environmental factors which may be operative even before conception by influencing Oocyte maturation and may contribute to the development of defective embryos and weak adult individuals [21]. It was also suggested that such a mechanism can explain the influence of season of birth on the timing of menarche, on the occurrence of menstrual irregularities and on the incidence of earlier and later menopause [21].

Handedness and age at natural menopause was also investigated in this study. Contrary with other studies [22-24] there was no significant association observed. This was also reported in some studies [25, 26].

Educational level found a significant association with the age at menopause. The level of significance was observed between primary and post-primary education. This may be linked to the economic status of these women as well as their living condition and lifestyle [27]. Several other studies [7, 28, 29] also found this association while some others found no association [30, 31].

The reason for the significant association ($P<0.0001$) observed between religion and age at menopause is unknown as Christians were observed to have a later menopausal age of 2.7 years than Muslims. However, this can only probably be explained by certain practices and restriction placed on individual lifestyle by religion as no known study has established this. One of such restriction is the use of contraceptive pills which is forbidden by the Islamic region except in critical medical condition where life is threatened [32, 33]. Another reason that might account for this is the geographical location of the Muslim subjects. Garrido-Latorre *et al*. [27] observed an early menopausal age in women living in an altitude 3000m above sea level which is a characteristic of the geographical location of the Muslims participants in this study.

Ethnic background also showed a significant association with age at menopause. The level of significance was observed between Hausa women and those form other tribe. This suggests that an average Hausa woman would attain menopause 3 years before an Igbo or Yoruba and about 5 years earlier than women from other tribe. Interplay between the gene, environmental factors and lifestyle would have been responsible for the observed difference [27, 34, 35].

Menopause and reproduction

Age at marriage and parity showed a linear significant association ($P<0.0001$). Age at menopause increased with age at marriage so that women who had their first child at above 30 years of age had a later menopausal age of 48.5 years. So also was menopausal age found to increase with increase parity as women who had no child, one and four or more had menopausal ages as 39.3, 43.2 and 46.1 years respectively. This study also found significant association between women who reported having nausea and vomiting of pregnancy in their reproductive days, those who breastfed and women who used contraceptives. Menopausal ages for these groups of women increased by 1.1, 5.5 and 1.7 years respectively when compared to their counterpart who did not. This was consistent with other findings as the sustained level of the female sex hormone due to late child birth has been proposed to be responsible for this later menopausal age [7, 27, 31, 36].

This study found no significant association between menarcheal age, length of menstrual flow and age at first birth. However, age at menopause was observed to increase with increase in age at first birth. This is in agreement with the earlier report from this study on the significant association observed between age at marriage and age at menopause. The non-significant association between menarcheal age and menopause was found in other studies [37-39] but contrasting to several others [40-42]. Factors which might have influenced this finding could be error in recall of menarcheal age and the difference in sample size.

Some studies [43, 44] have reported association between menopause and consanguinity, the focus was on menopausal age of grandmother, mother and sisters. This study reports the first association between numbers of elder brother and the age at menopause ($P<0.009$). Women born after several male children were observed to have early menopause and this age further reduced with increase in male siblings. This can only be accounted for by increased testosterone level which has been associated with infertility [45]. However, these women according to Klinga *et al.* [46], and Nicola [47] have a higher probability of having more sons than daughters. This association was not observed with increased number of female siblings.

CONCLUSION

Several factors have been considered as predictors of age of natural menopause. However, there seem to be interplay between prevailing environmental factors and reproductive characteristics in addition to inherent genetic makeup.

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