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Age at Menarche, Anxiety and Use of Oral Contraceptives as Predictors of Onset of Early Menopause among Civil Servant Women in Oyo State, Nigeria

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Abstract This study investigated age at menarhe, anxiety and oral contraceptive use as predictors of onset of early menopause among the civil servant women in Oyo State. 235 menopausal women were the respondents of this study. Descriptive research design of expo-facto type was the design employed to carry out the research. Three research instruments were utilised to collect data for the study, they are: (i) Menopause Symptoms Inventory – Revised (ii) State Trait Anxiety Scale and (iii) Contraceptive Use Questionnaire. Three research questions were raised and answered. The findings of the study established that there were significant correlation between early menarche, contraceptive use and onset of early menopause. Early menarche has highest contribution to the onset of early menopause. Also the result revealed the joint contribution of the independent variables to the dependent variables. From the results obtained in this study, high anxiety was found to significantly correlate with onset of early menopause.

Keywords Menarche, Anxiety, Oral contraceptives, Early menopause, Civil servant, Women

1. Introduction

Menopause is the permanent cessation of menstruation resulting in the loss of ovarian follicle development. It is considered to occur when 12 menstrual cycles are missed (Gold 2011). Menopausal transition, or perimenopause, is the period between the onset of irregular menstrual cycles and the last menstrual period. This period is marked by fluctuations in reproductive hormones (Steiner, D'Aloisio, DeRoo, Sandler & Baird 2010) and is characterized by the following:

- Menstrual irregularities
- Prolonged and heavy menstruation intermixed with episodes of amenorrhea
- Decreased fertility
- Vasomotor symptoms
- Insomnia
- Some of these symptoms may emerge 4 years before menses cease, with a perimenopausal mean age of onset of 47.5 years (Joseph, Nagaraj Saralaya 2014). During the menopausal transition, estrogen levels decline and levels of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) increase.

During menopause, many women experience increased anxiety. Some also deal with anxiety in the years leading up to full-blown menopause, a time called *perimenopause*. Anxiety can arise as general nervousness or worry, specific fears, recurrent panic attacks, or intrusive thoughts and associated compulsions. Anxiety can often occur in combination with depression. Both pre-existing and newly diagnosed anxiety disorders can occur throughout all phases of menopause, including post-menopause. While the exact connection between anxiety and menopause remains unclear, a complicated combination of factors common during this transitional time in a woman's life may contribute.

The transition from a woman's fertile period to the period in which the ovaries begin to lose their function is achieved gradually. It is for this reason that it is difficult to set down a definite age at which menopause will begin for every woman. This period generally commences in the fourth decade of life and varies from one woman to another. Community-based studies indicate that the distribution of menopausal age displays a bell curve that ranges from age 40, ending around the age of 54, generally clustering around the ages 45-55. A woman's reproductive cycles can exert great influence over her emotional and mental health (Gao, Lin & Wei 2013). The shifting levels of the hormones *estrogen* and *progesterone* play a part in the mood swings and ups and downs that accompany PMS and pregnancy. During menopause, those same hormones fluctuate and freefall, often impacting moods and possibly amplifying any anxiety symptoms a woman already feels. Some women who use hormone replacement therapy experience an increase in anxiety

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symptoms when they transition off the therapy.

The symptoms of menopause can worsen existing mood and anxiety problems. Night sweats, for instance, can wake a woman out of a sound sleep or make it difficult to get to sleep in the first place. Lack of sleep can lead to fatigue, which can in turn make a woman feel irritable and unable to concentrate. Menopause happens at a time in life that is often associated with greater life stress. Midlife worries and responsibilities accumulate, and chronic stress can leave a woman vulnerable to anxiety. Common midlife stresses include taking care of children and aging parents, as well as issues in relationships (divorce, widowhood), money, and career. The way a woman feels about herself and her stage in life can factor into her overall mental health. The changes to a woman's body and appearance as she gets older and goes through menopause can worsen self-esteem that is already low. Some women experience disappointment about getting older or not being able to have children anymore. Unhealthy lifestyle habits, like smoking and not getting enough physical activity, can also factor into a woman's vulnerability to anxiety, no matter what stage of life she is in.

For women in their 40s and 50s who are going through menopause, one of the most common causes of anxiety is decreased estrogen levels. Estrogen declines during perimenopause, or the time before menopause, as the body prepares to cease egg development and menstruation. Scientists have discovered that estrogen has a significant effect on the brain's regulation of moods and emotion. While this relationship appears complex, experts do know that changes in estrogen levels have a direct effect on the neurochemicals serotonin, norepinephrine, dopamine, and melatonin. Since all of these chemicals play an integral role in emotion and mood regulation, disruptions caused by estrogen fluctuations can lead to anxiety during menopause. Anxiety can even make certain menopause symptoms worse. In one study, women with even moderate anxiety were found to be about 3 times as likely to suffer through hot flashes. When menopause comes early, it can pack an emotional punch. How individual react to early menopause may depend on individual's health, the amount of stress they are experiencing, and what kind of relationships and emotional support they have. For many women, early menopause can cause shock, sadness, fear, and anxiety. There may be a sense of loss and loss of control. Loss of fertility may change their self-image and affect their self-esteem. Early menopause can change the way women see themselves as a sexual partner. Physical stress can cause women to stop having their period. Common examples are women who are long-distance runners and women with anorexia.

The menarche and menopause are two important biological events, which occur in the life cycle of every normal female. It is established doubt that the mean age of onset of menarche and age of menopause varies from one population to another due to several factors, viz., heredity, environment, nutritional status, physical activity, occupation and obesity etc. Although there are many factors that influence the onset of menopause, there is no consensus as to whether these factors are definitive in all women. Studies show that the onset age of menopause is affected by the age at the first menstrual period, the use of oral contraceptives, the number of pregnancies experienced, Body Mass Index (BMI), smoking, drinking alcoholic beverages, physical activity, blood lead levels and other factors (Joseph, Nagaraj & Saralaya, 2014; da Silva & d'Andretta Tanaka, 2013; Olaolorun & Lawoyin 2009). An association has been found between life-long irregular menstrual cycles and a later menopause. An early menarche has been associated with early menopause. Nulliparity has been associated with early menopause, while multiparity is related to late menopause. Boynton-Jarrett, Rich-Edwards and Fredman (2011) studies reported a direct association between the age at menarche and menopause. Of note Henderson, Bernstein, Henderson, Kolonel and Pike 2008 only two had prospectively collected data, although one of these analyzed age at regular, not first, menses (Sammel, Freeman, Liu, Lin & Guo, 2009) the other four cohort studies, three had censored data sets; and Otero, Chor, Carvalho, Faerstein, Lopes Cde and Werneck, 2010. Three analyzed baseline data. Lucas (2010). Only those who would have experienced an early menopause, and therefore the direct correlation of early menarche and early menopause would more likely appear.

A number of researchers have posited that the timing of menarche and/or menopause is sensitive to psychological stress. In the case of menarche, psychological stress has been hypothesized to accelerate the onset of menarche as a reproductive "strategy (Jean, Wilkinson, Spitz, Prokhorov, Bondy & Forman 2011). High levels of risk or uncertainty in childhood are thought to accelerate reproductive development (i.e., menarche) toward a first birth. With regard to menopause, childhood stress has been hypothesized to accelerate the age of menopause because of a higher rate of follicular atresia (Ferris, Flom, Tehranifar, Mayne & Terry 2010). It is unclear whether follicular atresia occurs relatively close to the time of childhood stress or whether childhood stress potentially alters later-life stress responses that may then influence atresia. Another possible pathway between stress experienced in adulthood and follicular atresia is the modulation of the rate of cellular aging by stressors (Windham, Zhang, Longnecker & Klebanoff 2008). It should be noted that considerable ambiguity surrounds the specific biological mechanisms involved in the associations between childhood and adult psychological stress and the timing of menopause.

Women in developing countries who reach menopause early may be experiencing the same condition as anorexics and runners, rather than the natural progression of aging. Women in Nigeria tend to experience menopause about eight years earlier than in developed countries," (Olaolorun & Lawoyin 2009). On average, American women experience menopause at about 51 years old, while rural Bangladeshi women, for example, are about 43 years old at menopause. "Two possible explanations were offered for this, rural women in developing countries naturally enter menopause earlier, or the apparent earlier age of menopause is a

stress-related shutdown of the ovarian cycling. Urban women in developing countries tend to have a later age of menopause. "By the time women in developing countries reach their early 40s, they have had repeated pregnancies, breast-fed for most of their adult lives and have a relatively high disease load," "These women have very low body mass, and their amenorrhea -- absence of menstruation -- may be due to the same things that affect runners and anorexics" (Chen, Lin & Wei 2013). The factors that influence age at menopause are FSH concentrations, long lasting use of oral contraceptives (OC) may also delay therefore also likely to determine the age at which preceding age at menopause. Reproductive events occur, such as the beginning of subfertility and the end of fertility. The few studies that included the effect of OC use in their design found either a delaying effect of OC use on age at transition from regular menstruation to the peri-menopause, (Freeman & Sherif 2007) or with irregular cycles, and the subsequent transition to menopause are mainly determined by the size of the residual follicle. The size of the follicle pool is determined by the woman's initial number of oocytes, and by hormone replacement therapy (HRT) or OCs for the rate at which these oocytes are lost. It is generally accepted menopausal complaints, leading to a potentially spurious positive that FSH has a predominant role in the late stages of follicular association between OC use and menopausal age (Blumel & Chedraui 2011). If it can be confirmed that use of high dose OCs delays age at menopause it is also likely that use of high dose OCs delays the end of fertility. If lower dose OCs also have a delaying OC use is characterized as ever use of OCs duration of use, and effect on menopause, this could be a promising perspective duration of use of high dose OCs Ever use was de fined as OC use for women who postpone their first pregnancy until their for at least 3 months. Duration of OC use was defined as the sum of thirties by means of OC use. years in which a woman used OCs for at least 3 months. However it is known that the age of natural menopause and frequency of various menopausal symptoms differ in different societies. It is therefore worthwhile to establish relevant data for the Nigerian society. Thus, this present study was aimed at establishing the pattern age at menarche, anxiety and oral contraceptive use as predictors of onset of early menopause experiences.

2. Objectives of Study

The main objective of the present study was to examine the effects of age at menarche, anxiety and use of oral contraceptives as predictors of onset of early menopause among civil servant women in Oyo state. Other objectives include to;

1. determine significant relationship between age at menarche, anxiety and use of oral contraceptives and onset of early menopause among civil servant women.
2. predict the extent to which the joint contributions of age at menarche, anxiety and use of oral contraceptives would determine the onset of early menopause among civil servant women.
3. assess the relative contribution of the age at menarche, anxiety and use of oral contraceptives on the prediction of onset of early menopause among civil servant women.

3. Research Questions

The following research questions were raised and answered to guide this study.

1. Would there be significant relationship between age at menarche, anxiety and use of oral contraceptives and the onset of early menopause among civil servant women?
2. To what extent would the joint contributions of age at menarche, anxiety and use of oral contraceptives determine the onset of menopause among civil servant women?
3. What is the relative contribution of the age at menarche, anxiety and use of contraceptives on the prediction of onset of menopause among civil servant women?

4. Methodology

Design

The study adopted a descriptive research design of ex-post facto type. This design was adopted because the researcher does not have direct control on the independent variables because their manifestation had already occurred.

Sample and Sampling Techniques

Women aged 40-65 not using hormone replacement therapy, who were willing to take part in the study and provided written consent, were eligible for inclusion in the study. Two hundred and fifty questionnaires were given out, from which 235 were returned; 235 correctly completed questionnaires were subjected to further analysis. The return rate was 94%. Out of the sampled women 105 (44.7%) started menstruation before age 13 while 130 (55.3%) had their first menstruation starting from age 15. Concerning their level of educational 85 (36.2%) had Higher National Diploma (HND) and above while 150(63.8%) had less than HND certificate. For contraceptive use 112 (47.7)were found to engage in high and constant use of contraceptives while 39.1% and 13.2% were moderate and low users of contraceptives respectively.

Instruments

The set of research tools used to collect data consisted of:

1. **Menopause Symptoms Inventory (Revised Edition MSI -R).** Menopause Symptoms Inventory (Revised Edition MSI-R) was developed by Busari (2013). The first use of the inventory dates back to 2007, when the symptoms of menopause were documented and their changes during the treatment were observed, In 2006, a

randomized study of the representative group of 109 women aged 40-60 was carried out in Ibadan, and based on the results, an evaluation of the scale was conducted. At present the inventory is used to assess the symptoms of menopause among women of various tribes and nationalities, evaluating sleeplessness, sleep disorders, hot flashes, night sweats etc. The currently available scientific evidence indicates the high methodological quality of the MSI -R to measure and compare the symptoms of menopause in the area of the quality of life of aging women in various regions of the world and because of the high reliability of the scale. The tool is characterized by the ease of understanding for respondents and the clarity of questions. It contains 110 symptoms of menopause (hot flashes and sweating; heart problems; sleep problems; depressive mood; irritability; anxiety; physical and mental fatigue; sexual problems; bladder problems; vaginal dryness; discomfort connected with joints and muscles, disorientation, increase in facial hair, degenerative bone disorder, breath odour etc.) whose intensity should be marked on the axis of the 5 categories: Never -1, Rarely-2, Sometimes-3, Often-4 and Always-5. The respondent ensures subjective perception of symptoms by marking 1 of 5 possible fields. The total result of MSI –R is from 1 (Never) to 550 points (the highest grade of complaints of symptoms), and 110 the least grade of complaints of symptoms.

2. **State and Trait Anxiety Inventory:** The State-Trait Anxiety Inventory (STAI) is a commonly used measure of trait and state anxiety (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). It can be used in clinical settings to diagnose anxiety and to distinguish it from depressive syndromes. It also is often used in research as an indicator of caregiver distress Form Y, its most popular version, has 20 items for assessing trait anxiety and 20 for state anxiety. State anxiety items include: "I am tense; I am worried" and "I feel calm; I feel secure." Trait anxiety items include: "I worry too much over something that really doesn't matter" and "I am content; I am a steady person." All items are rated on a 4-point scale (e.g., from "Almost Never" to "Almost Always"). Higher scores indicate greater anxiety. The STAI is appropriate for those who have at least a sixth-grade reading level. Internal consistency coefficients for the scale have ranged from .86 to .95; test-retest reliability coefficients have ranged from .65 to .75 over a 2-month interval (Spielberger et al., 1983). Test-retest coefficients for this measure in the present study ranged from .69 to .89. Considerable evidence attests to the construct and concurrent validity of the scale (Spielberger, 1989).
3. **Contraceptive Use Questionnaire:** The Contraceptive Questionnaire was developed by (Davis, Yarber, Bauserman, Scheer, & Davis, 1998) and contains information on contraceptive history, personal attitudes about contraceptive, and frequency of contraceptive use. The Demographic tool was also used to identify additional factors associated with contraceptive use. The survey contains 8 questions which address religion, employment, and level of education, age, yearly income, and marital status. The instrument's test- retest reliability is $r(166) = 0.88$, $p < .001$ (Davis et al., 1998). The validity of the instrument is strong based on correlated scores with the premarital contraceptive attitude evaluation instrument, $r = .72$ (Davis et al., 1998).

Procedure

The study began in July 2015. It was completed in November 2015. All respondents, before completing the questionnaire, were informed about the aim of the study and anonymity of answers. They were made familiar with the instructions for completing the questionnaires and assured that the material would be used for scientific purposes. The respondents also completed forms with informed consent to participation in the study. The questions were adjusted on the basis of merit to the cognitive abilities of the study group.

Table 1. Descriptive Statistics and Inter-correlations among the Variables

Variables	N	Mean	SD	1	2	3	4	5	6
Onset of Menopause	1.000								
Early Menopause 10-14 years	.258**	1.000							
Late Menarche 15-19 years	.105	.019	1.000						
High Anxiety	.243**	.059	.232**	1.000					
Moderate Anxiety	-.107	.063	.169**	-.083	1.000				
Low Anxiety	.013	.048	.016	.052	.215	1.000			
High dosage of contraceptive use	.417**	.072	.233**	-.171	.221	.045	1.000		
Moderate dosage of contraceptive use	.229**	.059	.217**	-.155	.219	.057	.210	1.000	
Low dosage of contraceptive use	.183	-.037	.066	-.089	-.161	.047	.088	.077	1.000
Mean	25.653	13.781	66.171	24.131	36.321	21.411	23.163	20.111	1.733
Standard Deviation	5.913	3.513	9.131	4.733	6.917	4.705	3.413	4.313	.607

Table 2. Summary of Regression Analysis of the combined Individual Variables on the Prediction of Onset of Menopause

R = .815 R^2 = 0.746 R^2 (adjusted) = .765 Standard Error of Estimate = 11.856					
Analysis of Variance					
Source	**Sum of Square (SS)**	**DF**	**Mean Square**	**F**	**Sig.**
Regression	26667.603	09	2963.067	103.717	.000
Residual	27840.714	226	123.189		
Total	54508.317	235	3086.256		

Table 3. Relative Contribution of Independent Variable to the Prediction of Dependent Variables

	Unstandardised Coefficient	**Standardised Coefficient**		**T**	**Sig.**
Model	B	Standard Error	Beta		
Constant	13.915	2.731			
Early Menarche	.917	.157	.567	5.693	.000
Late Menarche	1.579	.241	.379	6.483	.000
High Anxiety	.855	.099	.553	7.547	.000
Moderate Anxiety	.679	.105	.306	6.793	.000
Low Anxiety	.751	.199	.238	3.851	.000
High dosage of contraceptive use	1.755	.291	.461	6.471	.000
Moderate dosage of contraceptive use	1.301	.283	.319	4.423	.000
Low dosage of contraceptive use	.439	.102	.301	4.207	.000

Data Analysis

Pearson Product Moment Correlation and multiple regression analysis were the statistical tools used to process the data collected for this study. Multiple regression analysis was used to establish the joint and relative contribution of independent on dependent variables.

5. Results

Table 1 shows correlation between age of menarche, anxiety, contraceptive use and early onset of menopause. The result revealed that early menarche (r=.258**, p<0.05); high anxiety (r=.243, p<0.05), high dosage of contraceptive use (r=.417, p<0.05) and moderate dosage of contraceptive (r=.229, p<0.05) had significant relationship with early onset of menopause among women civil servant in Oyo State. The result also indicated that late menarche (r=.105, p<0.05), moderate anxiety (r=-.107, p<0.05), low anxiety (r=.103, p<0.05) and low dosage of contraceptive use (r=.183, p<0.05) had no significant relationship with early onset of menopause among civil servant women in Oyo State.

The result on Table 2 revealed a significant combined effect of independent variables (age of menarche, anxiety and contraceptive use) to the prediction of the onset of early menopause among civil servant women in Oyo State. The result yielded a coefficient multiple regression R = 815, p<0.05. The equation also showed adjusted R^2 of 0.746 suggested that the independent variables accounted for 74.6% variation in the prediction of onset of early menopause among civil servant women when pulled together. The table also indicated that the analysis of variance for the regression yielded on F ratio of 103.717 (significant at 0.05 level). It implied that the joint contribution of the independent to the dependent variables was significant and that other variables not included in this model may have accounted for the remaining variance.

Table 3 indicated the significant contribution of each of the independent variables. The result revealed that early menarche has the highest contribution to the onset of early menopause among civil servant women (B=.567; t=5.693, p<0.05). The contribution of other independent variables to the onset of early menopause among the civil servant women was observed in the following order: High anxiety (B=.553; t=7.547; p<0.05), high dosage of contraceptive use (B=.461; t=6.471; p<0.05), late menarche (B=.379, t=6.483; p<0.05), moderate dosage of contraceptive use (B=.319; t=4.423; p<0.05), moderate anxiety (B=.306; t=6.793; p<0.05), low dosage of contraceptive use (B=.301; t=4.207; p<0.05) and low anxiety (B=.238; t=3.851; p<0.05) in that order.

6. Discussion

The result of the first research question showed that the onset of early menopause had significant relationship with early age of menarche, high anxiety, high dosage of

contraceptive use and moderate dosage of contraceptive use but did not have significant correlation with late menarche, moderate anxiety, low anxiety and low dosage of contraceptive use. The implication of this finding is that women who started menstruation at early age are more likely to reach menopause early. So also women with high level of anxiety and those with high and moderate usage of contraceptive are likely to have their menstruation ceased early in their lives. Meanwhile, the result of this study indicated that women who started menstruation late and those with moderate and low level of anxiety, together with low usage of contraceptive are likely to experience late onset of menopause. This result is consistent with the findings of Lucas (2010), who found that only those would have experienced an early menopause had direct correlation with early menarche.

Analysis of the result of the second research question revealed that age of menarche, anxiety and contraceptive use jointly predicted and correlated with early onset of menopause of civil servant women in Oyo State. The result justified that onset of menopause is a functions of many psychological and personal factors which include early menarche, psychological and personal factors which include high anxiety, high and moderate usage of contraceptives which are strong contributors to early onset of menopause.

The study corroborate the study of Joseph Nagaraja and Saralagda (2014), da Silva and d'Andretta Zanaka (2013), Oladiaren and Lawoyin (2009) whose results revealed that the onset age of menopause is affected by the age of first menstrual period, the use of oral contraceptive, the number of pregnancies experienced, Body Mass Index (BMI), smoking, drinking alcoholic beverages, physical activity, blood lead levels and other factors. The implication of this is that the earlier the age of menarche, the early the onset of menopause.

The third and the final research question showed the significant contribution of independent variables. Early menarche had highest contribution to onset of early menopause among the women civil servant of Oyo State and low anxiety had the least contribution to the early onset of menopause. This implies that those women who started menstruation early are likely to experience early cessation of menstruation. This study is however in contrast with the findings of Gold (2011) in his review of evidence spanning several decades stated that age at menarche is "fairly consistently" not associated with age of menopause especially after adjusted for other reproductive variables.

High anxiety was found to have significant correlation with early menopause according to results obtained from this study. This finding was in line with the results obtained from the studies of Gao, Lin and Wei (2013) when they found that for women in their 40s and 50s who are going through menopause, one of the most common causes of anxiety is decreased estrogen levels. Estrogen declines during perimenopause, or the time before menopause, as the body prepares to cease egg development and menstruation. Scientists have discovered that estrogen has a significant effect on the brain's regulation of moods and emotion. It follows therefore that while this relationship appears complex, experts do know that changes in estrogen levels have a direct effect on the neurochemicals serotonin, norepinephrine, dopamine, and melatonin. Since all of these chemicals play an integral role in emotion and mood regulation, disruptions caused by estrogen fluctuations can lead to anxiety during menopause. The study concluded that anxiety can even make certain menopause symptoms worse and that women with even moderate anxiety were found to be about 3 times as likely to suffer through hot flashes. When menopause comes early, it can pack an emotional punch.

A number of researchers have posited that the timing of menarche and/or menopause is sensitive to psychological stress. Jean, Wilkinson, Spitz, Prokhorou, Bondy and Fariran (2011) asserted that in case of menarche psychological stress has been hypothesised to accelerate the onset of menarche as a productive "strategy" while high levels of risk or uncertainty in childhood are thought to accelerate reproductive development (menarche) towards a first birth. With regard to menopause, childhood stress has been hypothesised to accelerate the age of menopause because of a higher rate of follicular atresia (Ferris, Flan, Tehranifar, Mayne & Terry, 2010).

7. Conclusions

Natural progression of age is not the one responsible for early menopause in women in developing countries. This is because menopause is a stress-related shutdown of the ovarian cycle by the time the women in developing countries reach their early 40s, they must have had repeated pregnancies, breast-fed for most of their adult lives and have a relatively high disease load, they must have, have very low body mass, and their absence of menstruation may be due to the same things that affect runners and anorexics. Menopause naturally occurs when a woman's ovaries have no follicle left and can develop to release fertile eggs. Because women have a set number of follicles that begin to undergo atresia degeneration and resorption in the fetus, when all follicles are used up, they enter menopause.

Finally, early menarche was related to early menopause in this study although the available findings are not consistent in this regard.

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