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## Clinical, hormonal and biochemical features of menopausal women in Ibadan, Nigeria

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### Summary

As a result of the general lack of information about the menopause in Nigeria this study was conducted to determine the prevalence of climacteric symptoms in a cohort of healthy perimenopausal women and also to evaluate the hormonal and biochemical profile of the subjects. Seventeen menopausal and 19 premenopausal women aged 40 years or more were interviewed and had venepuncture and collection of 24-h urine samples. Plasma from the blood samples was used for the assay of LH, FSH, progesterone, 17 $\beta$ -oestradiol, calcium and cholesterol while urinary calcium was determined from the 24-h urine samples.

The data revealed a significant difference in the prevalence of the symptoms of vasomotor instability (hot flushes, palpitations and excessive sweating) among the menopausal group when compared with the premenopausal group. Furthermore, plasma gonadotrophin levels (LH and FSH) were significantly elevated while plasma oestradiol and progesterone levels were lower in the menopausal women than in the premenopausal group. With regards to the biochemical indices evaluated, only 24-h urinary calcium levels were found to be significantly different for the two groups, with higher levels in the menopausal women.

The significance of these findings and the need for adequate screening and treatment of selected menopausal women are discussed.

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### Résumé

Du fait du manque général d'informations sur la ménopause au Nigéria, cette étude a été menée afin de fixer avec précision la fréquence des symptômes climactériques dans un groupe de femmes dans leur préménopause et en bonne santé, et afin de déterminer le profil hormonal et bio-chimique des personnes examinées. On a interrogé 17 femmes ménopausées et 19 femmes dans leur préménopause, âgées de 40 ans ou plus, avec prise de sang et recueil des urines sur 24 h. Le plasma recueilli à partir des prélèvements de sang a été utilisé pour des tests d'hormones LH, FSH, de progestérone, de 17 $\beta$ -oestradiol, de calcium et de cholestérol; le calcium dans les urines a été déterminé à partir des urines de 24 h.

Les données ont révélé une différence significative dans la prévalence des symptômes d'instabilité vaso-motrice (bouffées de chaleur, palpitations et sueurs excessives) parmi le groupe des femmes ménopausées en comparaison avec celui des femmes dans leur préménopause. Qui plus est, les niveaux de gonadotrophine à partir du plasma (LH et FSH) étaient significativement élevés, alors que ceux d'oestradiol et de progestérone étaient plus bas, chez les femmes ménopausées par rapport à celles du groupe au stade de la préménopause. En ce qui concerne l'évaluation des indices biochimiques, on a trouvé que seuls les niveaux de calcium dans les urines de 24 h étaient significativement différents pour les deux groupes; les niveaux étaient plus élevés chez les femmes ménopausées.

On a étudié la signification de ces constatations ainsi que la nécessité d'un examen approprié et d'un traitement des femmes ménopausées sélectionnées.

## Introduction

The 1980 meeting of the WHO Scientific Group on Research on the Menopause revealed the general lack of information about the socio-cultural significance of menopause in the developing countries of the World, especially Africa. A number of reasons may be advanced for this state of affairs. The average life expectancy of women in Africa is approximately 49 years (compared with 70–75 years in developed countries) so many of the women in the region do not reach menopausal age and therefore do not experience the known symptoms of menopause. Furthermore, it may be that women in the region regard menopause essentially as a physiological process unworthy of medical consultation or sophisticated medication.

In the developed countries of the world a number of surveys have been conducted in order to determine the incidence of a variety of perimenopausal symptoms [1–4]. In Nigeria, information on the menopause is scarce.

The objective of this study therefore, was to determine the prevalence of climacteric symptoms in a cohort of healthy perimenopausal Nigerian women and also to evaluate the hormone profile and biochemical indices which are known to be altered by this decline in ovarian activity.

## Subjects and methods

A group of healthy Nigerian women volunteers working at the University College Hospital were recruited and interviewed. Using a structured questionnaire designed to assess the occurrence of selected symptoms and signs known to be associated with the menopause, they were divided into two groups. The premenopausal group consisted of women above the age of 40 who were still having regular/irregular menstrual cycles. The menopausal women were those who had ceased to menstruate for a period of 6 months or more.

Venous blood samples were obtained from all the women and immediately centrifuged and the plasma was stored at  $-20^{\circ}\text{C}$  until analysed. Furthermore, 24-h urine samples were collected for the determination of urinary calcium levels.

Serum levels of luteinizing hormone (LH) and follicle stimulating hormone (FSH) were

measured using specific radioimmunoassays optimized by the Radiochemical Centre (Amersham, U.K.). Serum progesterone and  $17\beta$ -oestradiol were estimated by radioimmunoassay methods using matched reagents provided by the World Health Organization.

Plasma cholesterol was assayed by quantitative enzymatic determination in serum at 500 nm. Plasma and urinary calcium assay was by the dilution method adapted to the atomic absorption spectrophotometer (Perkin Elmer 4000).

## Results

There were 37 menopausal and 32 premenopausal women who consented to the interview and were booked for the laboratory investigations. However, only 17 menopausal and 19 premenopausal women eventually submitted themselves for venepuncture and provided 24-h urine samples.

### Clinical features

Table 1 shows selected characteristics of the two groups of women. Whilst there was a statistically significant difference in the mean ages ( $P < 0.001$ ) and the mean weight ( $P < 0.001$ ) of the two groups, there was no difference ( $P < \text{n.s.}$ ) in the mean parity, height and blood pressure levels. For the menopausal group the mean age ( $\pm$  s.d.) at menopause was  $52.8 \pm 7.1$  years. The mean duration of menopause was  $51.5 \pm 55.8$  months (range 6–216 months).

Figure 1 shows the prevalence of selected symptoms among the two groups of women. There was a statistically significant difference in the prevalence of hot flushes among the menopausal women (70.3%) when compared with the premenopausal group (25.0%) ( $P < 0.001$ ). Similar significant differences ( $P < 0.001$ ) were found in respect of palpitations and excessive sweating. However, the differences in the incidence of insomnia, depression, pelvic pain, vaginal discharge, loss of libido and dyspareunia were not significant.

### Hormone profile

Figure 2 shows the hormone profile of the two groups of women. The difference in the mean



Table 1. Selected characteristics of perimenopausal women in Ibadan

Characteristic	Premenopausal women (n = 32)	Menopausal women (n = 37)	P value
Age (years)	44.6 ± 3.7*	53.2 ± 5.7	< 0.001
Parity	4.2 ± 1.4	4.5 ± 2.3	n.s.
Height (cm)	158.6 ± 5.4	158.6 ± 8.2	n.s.
Weight (kg)	67.3 ± 12.7	59.4 ± 11.5	< 0.01
Blood pressure			
Systolic	118.9 ± 12.9	118.5 ± 15.7	n.s.
Diastolic	74.2 ± 9.0	75.6 ± 12.8	n.s.

\*Values represent means ± s.d.

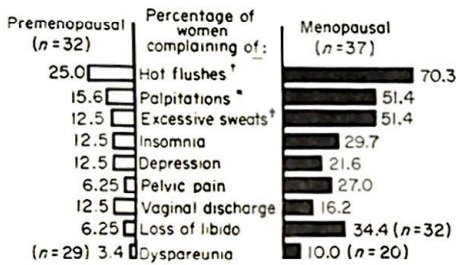


Fig. 1. Climacteric symptoms in premenopausal and menopausal women in Ibadan, Nigeria. \* $P < 0.01$ ; † $P < 0.001$ .

levels of serum FSH between the menopausal women ( $55.1 \pm 3.7$  IU/l) and the premenopausal group ( $6.4 \pm 2.1$  IU/l) was significant ( $P < 0.001$ ). A similar observation was made in respect of serum LH.

The mean level of serum oestradiol for menopausal women ( $0.10 \pm 0.08$  nmol/l) was lower than that for the premenopausal women (follicular or luteal phase), but the difference was not significant. In contrast, the difference in the serum progesterone levels was statistically significant ( $P < 0.001$ ). The mean progesterone level for menopausal women was lower than luteal phase levels for premenopausal women.

#### Biochemical indices

The mean levels of plasma calcium were  $8.2 \pm 1.2$  and  $8.7 \pm 9.9$  mg/100 ml for the menopausal and premenopausal women respectively. The difference was not statistically significant. However, the mean levels of urinary calcium;

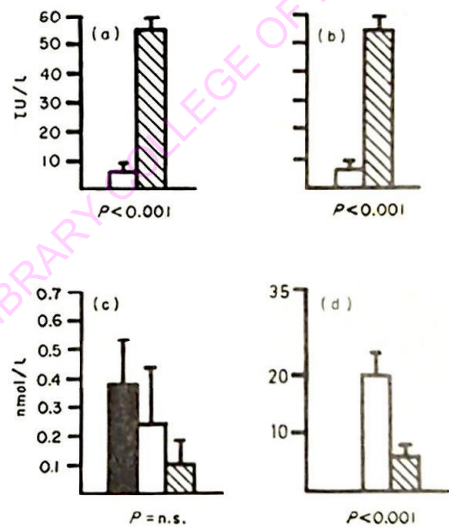


Fig. 2. Hormone profile of menopausal and premenopausal women in Ibadan, Nigeria. (a) Serum FSH levels and (b) serum LH levels in (□) premenopausal and (▨) menopausal women. (c) Serum oestradiol and (d) serum progesterone in (■) premenopausal (proliferative), (□) premenopausal (luteal) and (▨) menopausal women.

$305.7 \pm 88.0$  mg/24-h urine sample for the menopausal group and  $169.6 \pm 51.5$  mg/24-h urine sample for the premenopausal group, showed a statistically significant difference ( $P < 0.001$ , Fig. 3).

The mean level of serum cholesterol for menopausal women ( $182.1 \pm 30.9$  mg/100 ml) was higher than the mean level for premenopausal women ( $161.2 \pm 36.0$  mg/100 ml), but the difference was not significant.

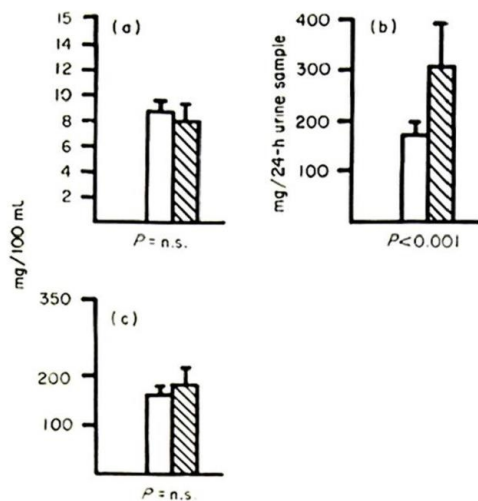


Fig. 3. (a) Mean plasma calcium, (b) urinary calcium, and (c) plasma cholesterol in (□) premenopausal and (▨) menopausal Nigerian women.

## Discussion

This report is the first in Nigeria to examine some of the clinical, hormonal and biochemical features of the menopause. Even though the number of volunteers recruited was small, the results have shown quite clearly that menopausal symptoms are recognized well by women in the sub-region. For example, the prevalence of hot flushes (70.3%) is comparable to the 65% noted among women in the Netherlands at 1–2 years after the menopause [3]. The symptom was also present among 25% of premenopausal women over the age of 40 years indicating rapidly declining ovarian activity.

The other symptoms whose prevalence among menopausal women was significantly higher than among premenopausal women (i.e. excessive sweating and palpitations) are both part and parcel of the symptom complex indicating vasomotor instability. This complex is characterized essentially by a rise in skin temperature, peripheral vasodilatation, transient increase in heart rate and changes in electrodermal activity [5–7]. The description of these subjective symptoms by Nigerian women in their local languages was classical enough for easy identification.

The pathophysiology of the hot flush still remains poorly understood. Whilst it is believed to be due to a sympathetic discharge [6] it has

also been observed to occur synchronously with a pulsatile release of LH from the pituitary [8,9]. It does not, however, appear to be a direct consequence of the raised LH levels [10,11].

The marked increase in the levels of FSH and LH observed in this study is similar to that reported by other workers [12–14]. These elevated levels of gonadotrophins indicate loss of ovarian function. The latter was assessed further by the assay of oestradiol and progesterone levels. As expected, there was a significantly lower mean value of serum progesterone among the menopausal women than among the premenopausal women. Oestradiol levels after the menopause were lower than the premenopausal levels, and the failure to demonstrate a statistically significant difference may be the small numbers of women in the groups. It could also possibly be because the most important circulating oestrogen in postmenopausal women is oestrone [15]. However, we were unable to assay this particular oestrogen because of lack of reagents.

Menopause has also been shown to be associated with significant changes in bone metabolism [16,17]. It would appear that there is a transfer of bone mineral and collagen from the skeleton to the plasma and urine resulting in osteoporosis and a consequent rise in the incidence of fractures of the distal radius, proximal femur and vertebrae [18,19]. In this study, a significant rise in 24-h urinary calcium levels was demonstrated in menopausal women. However, plasma calcium levels were not significantly different.

The effect of menopause on the risk factors for atherosclerotic cardiovascular disease also merits some comment. Whilst some studies have demonstrated an increase in serum cholesterol and triglycerides [20,21] the observed difference in the level of plasma cholesterol between menopausal and premenopausal women in this study was not statistically significant. This may perhaps be due to the small numbers of subjects evaluated in this study.

In conclusion, the findings of this study have shown that the clinical features, hormone profile and biochemical indices of the menopause are essentially the same among Nigerian women as they are among their counterparts in the developed countries of the world. Given the high prevalence of symptoms of vasomotor



instability it would appear that the majority of the Nigerian menopausal women are silent sufferers of the symptom-complex. Their failure to seek medical consultation for these symptoms is perhaps a result of a socio-cultural restraint which views menopause as a purely physiological manifestation of the ageing process. The need for increased public enlightenment about the symptom-complex and the availability of some treatment modalities for severe cases cannot be over-emphasized. Such enlightenment should start with the medical profession. It is hoped that this report will stimulate research activities into menopause in Nigeria. Priority should be given to epidemiological studies to determine the age of onset of menopause and to determine to what extent cultural, socio-economic and other factors (e.g. nutritional) influence the age of onset and incidence/characteristics of menopausal symptoms [3].

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