

VARIATIONS OF SERUM PROLACTIN LEVELS IN MALAY WOMEN FROM PREMENARCHE TO THE POSTMENOPAUSE

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SUMMARY

A double-antibody radioimmunoassay technique has been used to investigate the serum prolactin (hPRL) level in Malay females from premenarche to the postmenopause. The results showed that the hPRL level (mean \pm SEM) in the premenarchal, postmenarchal and late pubertal/reproductive subjects were 23.6 ± 2.3 , 19.1 ± 2.0 and 22.7 ± 1.9 ng/ml respectively. In premenopausal women, hPRL level (11.8 ± 2.4 ng/ml) was significantly reduced ($p < 0.01$) compared to that of late pubertal group; the level declined even further after menopause (9.5 ± 1.7 ng/ml). Although the difference in the mean prolactin levels between premenopause and postmenopause were not significant, 73% of the postmenopausal women had serum prolactin concentrations below 10 ng/ml compared to 44% of the premenopausal and 10% in late pubertal group.

INTRODUCTION

Variations in serum prolactin concentration in women have been widely reported.^{1,2,3} Data on the

changes in prolactin levels with age with particular reference to the critical reproductive ages in Malay women is however lacking. This paper presents some preliminary data concerning this hormone in Malay women from premenarche to postmenopause.

Ehara *et al.*,¹ and Lee *et al.*,² in their studies on serum prolactin concentration in women during puberty have selected their subjects on the basis of chronological ages. A major difficulty of correlating the endocrine changes with age is that there is a wide scatter of pubertal development for ages 10 to 16 years.³ It is also difficult to apply rigid criteria in the local situation particularly in obtaining volunteers who would submit to pubertal staging. Therefore the present study selected the subjects based on two criteria, namely, chronological ages of the subjects and accepted definitions for classification into premenarchal, postmenarchal, late pubertal, premenopausal and postmenopausal groups.

MATERIALS AND METHODS

Subjects

The premenarchal group comprised of 37 school girls between 10 and 16 years of age (mean age 12 years) who had never menstruated. The postmenarchal group comprised of 27 girls whose ages ranged from 11 to 18 (mean age 13 years). They attained menarche during the six months prior to the commencement of this study and had had one to four menstrual periods. Parental consent and permission

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from the schools and the Ministry of Education were obtained for these two groups of school children who volunteered.

26 second-year medical students of the Universiti Kebangsaan Malaysia aged 20 to 21 years participated in the study of serum hPRL levels in late pubertal/reproductive age group. Four blood samples from each individual were taken during preovulatory, ovulatory and postovulatory phases as well as during menses. The ovulatory status was based on the basal temperature chart. The average value from four readings was taken as the final value for each subject.

There were 16 women aged 41 to 52 years (mean age 45 years) in the premenopausal group and 37 women between 41 and 76 years of age (mean age 55 years) in the postmenopausal group. Women above 40 years with irregular periods during the past two to 24 months and with or without menopausal symptoms were considered to be premenopausal, while those who had ceased menstruating for at least six months were classified as postmenopausal. Both these groups of women were rural villagers in the Tanjung Karang area of Selangor. Prior to blood sampling, they were examined by a Medical Officer of the Tanjung Karang District Hospital who confirmed their health status and obtained other relevant information to enable the categorisation into pre- or postmenopausal.

Except for late pubertal women, single blood samples were taken from other groups. Blood samples were collected between 1030 and 1530 hours from all subjects in the five groups studied. The sera were separated and stored at -20°C until assayed, usually within one month.

Assay Procedure

Radioimmunoassay for prolactin was carried out using kits from Abbot Laboratories (Diagnostic Division, North Chicago, IL 60064, USA), as described previously.⁴

Serum samples from pre- and postmenopausal women were additionally assayed for luteinising hormone (LH) and follicle-stimulating hormone (FSH). Reagents and assay protocol (double antibody

RIA method) were provided by the World Health Organisation.⁵

The significance of the difference between means was assessed by Student's *t*-test.

RESULTS AND DISCUSSION

Prolactin level in all five groups of subjects are shown in Fig. 1. Our study shows that the mean serum prolactin levels in the premenarchal (23.6 ± 2.3 ng/ml), postmenarchal (19.1 ± 2.0 ng/ml) and pubertal groups (22.7 ± 1.9 ng/ml) are not significantly different between each other. This is in agreement with the finding of Lee *et al.*,² who showed that there was no significant change in serum prolactin concentration in girls before and soon after menarche, despite an increase in other steroid hormones (oestrone, dehydroepiandrosterone and 17-hydroxyprogesterone). Thorner *et al.*,³ however, found that serum hPRL levels in postmenarchal girls were significantly higher than those of premenarchal group. But it is not clear how long these girls had been postmenarchal since a significant increase in the level of hPRL was only detected at ages 14 and 15.¹

In our study the mean prolactin concentration and the scatter of values in the younger children are similar to that of the reproductive group. It is possible that the higher concentration seen in some of the children was influenced by stress of venipuncture. Indeed similar observations were noted in another study (Satgunasingam, unpublished observation) on prolactin levels in pubertal boys.

The present study has shown that the mean prolactin level in the premenopausal group (11.8 ± 2.4 ng/ml) is comparable with that of postmenopausal women (9.5 ± 1.7 ng/ml), despite higher LH and FSH concentrations for the latter group (11.1 ± 1.7 and 5.7 ± 1.5 IU/L for LH and FSH respectively in premenopause; 48.4 ± 4.4 and 64.2 ± 4.2 IU/L for LH and FSH respectively in postmenopause) (Table I). The mean value obtained from these postmenopausal Malay subjects is similar to that reported for Caucasian women by Pepperell *et al.*,⁶ (8.2 ± 4.0 ng/ml, mean \pm S.D.) and by Notelovitz *et al.*,⁷ (10.9 ± 2.9 ng/ml, mean \pm SEM). The

TABLE I
SERUM FOLLICLE STIMULATING HORMONE (FSH) AND LUTEINISING HORMONE (LH)
CONCENTRATIONS IN PRE- AND POSTMENOPAUSAL SUBJECTS

Group	Number of Subjects	Follicle stimulating hormone (IU/L)	Luteinising hormone (IU/L)
Premenopause	16	5.7 ± 1.5 ^a	11.1 ± 1.8 ^a
Postmenopause	37	64.2 ± 4.2 ^b	48.4 ± 4.4 ^b

a, b — Means with different superscript letters within a column differ significantly ($P < 0.05$).

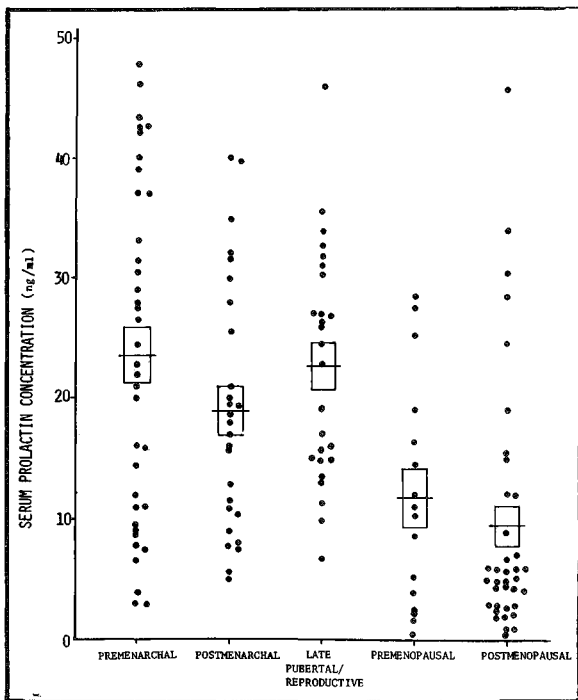


Fig 1 Serum prolactin concentrations in females before menarche, postmenarche and late puberty and in the pre- and postmenopause. The horizontal lines represent the mean values and the boxes represent the standard error of the mean of the group.

declining mean hPRL concentration in the premenopausal and postmenopausal group compared to those of the younger age groups may be related to the declining estrogen level.

Support for this view comes from various investigators. Nicoll *et al.*,⁸ showed that in rats, estrogen can reduce the hypothalamic prolactin-inhibitory factor (PIF) and the decrease in estrogen level during postmenopausal period caused an increase in the PIF

and/or a decrease in the prolactin-releasing factor (PRF) secretion, resulting in the reduction of prolactin levels. Furthermore, Rutlin *et al.*,⁹ found that a postmenopausal fall in basal prolactin level could be reversed by estrogen administration.

From our study, if 10 ng/ml is taken as the presumed demarcating value for lower and higher groups, then hPRL levels in twenty seven out of thirty seven (73%) postmenopausal subjects are below this value as opposed to 44% in premenopausal and 10% in late pubertal group. It is noteworthy that five of the 37 postmenopausal subjects had prolactin levels more than twice the mean concentration for the group. The clinical significance of this is not known. Indeed the incidence of pituitary adenomas or problems associated with hyperprolactinaemia in postmenopausal women have rarely been studied or reported in the literature, possibly because they seldom present with the classical symptoms for which prolactin tests are requested. Nevertheless we feel that further laboratory/clinical studies of postmenopausal women, both normal and those presenting with illness are warranted to throw some light on the significance of hyperprolactinaemia in this group.

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