

dose-response fashion, the dichotomization of a continuous exposure variable can lead to a substantial reduction of statistical power. Thus we believe that the analysis of dentine lead as a continuous variable is a viable, and most likely preferable, alternative to the approach of dichotomizing the exposure variable.

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## EPIDEMIOLOGY OF PREMENSTRUAL SYMPTOMS

The protocol, designed by Ramcharan *et al.* [1] to investigate reproductive health in women, would increase our knowledge of menstruation in normal women at various ages, but the technique of using an interviewer to record a questionnaire on symptoms on one specific day of the cycle will necessarily exclude those suffering from severe PMS. The definition of PMS is the presence of recurrent symptoms in the premenstruum with complete absence in the postmenstruum. Cases of severe PMS would be among the 1677 women who declined to participate in the study. Can one really expect a woman to agree to be interviewed immediately after a slanging match with her husband; after she has battered her children; thrown items across the room; crashed her car due to careless driving; is confused and exhausted; is breathless from asthma; vomiting from migraine; recovering from an epileptic fit or aphonic from laryngitis? If the interview is postponed for a week or so, the woman is likely to be asymptomatic and again the incidence of severe PMS is missed. Furthermore "recurrent" symptoms cannot be diagnosed on a one-day-only interview. Most PMS clinics recognize that among women claiming to have PMS only about 50% are able to confirm this on a prospective chart.

The effect of stress on the incidence of PMS, which was demonstrated in the study,

is recognized. It is probably related to the finding of Nock [2] that progesterone receptors will not bind to molecules of progesterone in the presence of adrenalin, for it has been hypothesized that PMS results from a failure at the level of progesterone receptors [3].

The authors express surprise that water retention symptoms are present both in the premenstrual and menstrual phases. Some women have slight bleeding for a day or more before the full menstrual flow, and relief of premenstrual symptoms does not occur until the full menstrual flow, so symptoms may occur in the menstrual phase. Such spotting represents the physiological premenstruum, but chronologically it is included in the menstrual phase [4].

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## *Response*

The first point raised by Dr K. Dalton was the concern that women who suffered from severe PMS would have been functionally too incapacitated to have participated in our community survey [1]. This concern is a legitimate one, to which we had also given thought. However, the findings in our study indicate, as we describe below, that an underestimate of the attributable risk, if it did occur, was small.

We also considered the possibility that women with a history of probable PMS might be less likely than non-PMS women to return the follow-up menstrual date card within the 60-day period subsequent to their interview date. However, 5.7% of the 2679 women who returned the menstrual card gave a history of probable PMS on initial contact, while 4.2% of the 1114 who did not return menstrual cards, had given a similar history.

A total of 1677 women declined to participate in the study. If we apply to this number the observed proportion of naturally cycling women among the participants (i.e. 3793/6232), we estimate that 1021 of the non-participants would presumably be experiencing natural cycles. Assuming the cycle length distribution in this group to be similar to that observed among participants, and applying the same procedure for determining 4-day phase lengths as used for participants (p. 382 of our article), a total of 662 women (i.e.  $1719/2650 \times 1021$ , see Table 1), would be available for analysis. Of these, 129 (i.e.  $325/1662 \times 662$ , see Table 5), would be in the premenstrual phase when the group is stratified by history of PMS and stressful life changes.

If we assume that women with a history of PMS would be so severely distressed during the premenstrual phase that they would be unable to participate in the survey, this would also lead to an underestimate of the lifetime prevalence of probable PMS in our population. However, a more valid estimate of the lifetime prevalence

can be obtained by excluding the group of participants who were in the premenstrual phase at the time of interview. In our study, phase assignment was determined for women with cycle lengths over 19 days (p. 381). This group consisted of 2632 women with cycle lengths 20-79 days, and among them were 153 women with a history of probable PMS. (Note that this total number of women is larger than the total number of 1719 women with cycle lengths 23-60 days that comprised the 4-day cycle phase groups). Among the 2632 women, there were 376 in the premenstrual phase, including 20 with a history of probable PMS. When this group of women in the premenstrual phase is excluded from the total, there remain 2256 women among whom were 133 with a PMS history, or 5.9%. This estimate is consistent with the lifetime prevalence of probable PMS across the menstrual cycle phases as shown in the bottom row of Table 5.

This revised lifetime prevalence of probable PMS, i.e. 5.9%, can be applied to the group of 129 non-participants (paragraph 3 above) who presumably would have been in the premenstrual phase had they been interviewed. Using the binomial distribution, there could be no more than 12 PMS women, with a probability less than 5%. We can now perform a "worst case" type of analysis on the data displayed in Table 5 of our article, by assuming that all of the 12 non-participating PMS women who were in the premenstrual phase at the time of contact were experiencing severe, handicapping psychological distress. This makes a total of 16 instead of 4 women in the premenstrual phase with a history of probable PMS and stressful life changes all year, out of a total of 454 ( $325 + 129$ ) in the premenstrual phase, i.e. 3.5%. Since the assumption that all of the non-participant PMS women in the premenstrual phase at the time of interview were severely afflicted is unlikely, we can conclude that in our population, 3.5% is a reasonable