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Psychological and social correlates of the onset of affective disorders among pregnant women[1]

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SYNOPSIS One hundred and twenty women recruited from attenders at the antenatal clinic of the Obstetrics Department of a general hospital were asked to complete *ad hoc* questionnaires during pregnancy; they were then interviewed by psychiatrists using a structured diagnostic interview, the Schedule for Affective Disorders and Schizophrenia (SADS). Nineteen (16%) women were identified as having an onset of an affective disorder during the period of pregnancy, mainly (68%) during the first trimester. As compared with the women without any such onset (controls), the women with pregnancy-related affective disorder (PRAD) were characterized by (1) it being their first pregnancy or first delivery with past termination of pregnancy, (2) early loss of either parent by death, (3) high Eysenck Personality Questionnaire (EPQ) Neuroticism (N) and Psychoticism (P) scores, (4) living in a flat with either a plan to stay there after the forthcoming childbirth or an expectation that their accommodation would be crowded, and (5) negative response to the news of the pregnancy by the husband with low intimacy. The effects of these factors were additive since the probability of developing a PRAD episode was highly correlated with the number of factors reported.

INTRODUCTION

The focus of most of the investigations on psychiatric disorders of childbearing women has been on the psychiatric conditions observed during the puerperium. Less attention has been paid to the mental health of pregnant women (Campbell, 1988). The interest of recent investigators has shifted, however, towards pregnant women not necessarily requiring psychiatric intervention for less severe psychiatric disorders during the antenatal period. Recent findings (Cox, 1979; Zajicek, 1981; Cox *et al.* 1982; Kumar, 1982; Kumar & Robson, 1984; Watson *et al.* 1984; Cooper *et al.* 1988; Sharp, 1988; Martin *et al.* 1989) suggest that pregnant women do not have an increased resistance to the development of psychiatric disorders.

The present report is, to our knowledge, the first to examine the onset of affective disorders defined by operationalized diagnostic criteria among Japanese pregnant women. The aims of the study were: (1) to calculate the incidence of affective disorders during pregnancy; and (2) to identify the psychiatric, psychological, obstetric and social variables which characterize these affective disorders.

METHOD

Subjects

One hundred and twenty women were recruited from attenders at an antenatal clinic in the obstetrics department of a general hospital in Kawasaki, a heavily industrial city in Japan. Women were invited to participate in the study by a gynaecologist while attending the clinic on two particular days a week when research psychiatrists and psychologists were available. Virtually no women declined. The hospital is run by the city authority and caters for the population of the southern half of the city. Pregnancy had been confirmed when the foetal heart beat was recorded by echocardiography. Women at more than 12 weeks gestation were

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excluded. No other exclusion criteria were applied.

The subjects were aged 17 to 42 years with a mean (S.D.) of 27·9 (4·6) years. All were married. For 42 (35%) women, the present pregnancy was their first; for 51 (43%), their second; for 17 (14%), their third; the remaining 10 (8%) had experienced more than two previous pregnancies. Sixty-six (55%) of the women had never experienced obstetric delivery in the past; 46 (37%) had experienced delivery once; and 8 (7%) twice. No women had delivered three or more children. Forty-two (35%) of them had experienced termination of a prior pregnancy. An educational level of college graduation or more was achieved by 27% of the women. Only 25% were employed outside the home.

The present marriage was the first one for 98% of the women and for 94% of their husbands. College graduation, or higher educational level, had been achieved by 35% of husbands. Seventy-seven per cent of the husbands were 'white-collar workers'. Social class was not examined in the present study since no consensus has been reached as to the definition of social class in Japan.

Experimental design

A set of questionnaires was distributed three times, in early (when the foetal heartbeat was first confirmed), middle (approximately 20 weeks gestation) and late (approximately 34 weeks gestation) pregnancy. The women were interviewed twice, in early and late pregnancy, by a psychiatrist. The data on the second interview were not available for 14 women; five did not attend the interview; one moved away from the area; four changed hospital; three experienced intrauterine foetal death; and one had a terminated pregnancy.

1. Interview

Psychiatric interviews were conducted in early and late pregnancy by either of the two psychiatrists (T.K. and S.S.) using the Schedule for Affective Disorders and Schizophrenia (SADS) (Spitzer & Endicott, 1978*a*), a structured diagnostic interview. The standard version of the SADS was conducted in early pregnancy and the change version of the SADS (SADS-C) (Spitzer & Endicott, 1978*b*) in late pregnancy. Psychiatric diagnosis was established following the rules of the Research Diagnostic Criteria (RDC) (Spitzer *et al.* 1978). The reliability of the SADS and the RDC diagnosis had been confirmed by a case vignette strategy (Kitamura *et al.* 1986).

Family history of first-degree relatives was obtained from the pregnant women in the first interview using the Family History Questionnaire (FHQ) (Kitamura, 1978), following the Family History–Research Diagnostic Criteria (FH-RDC) (Endicott *et al.* 1978). The reliability of the FH-RDC by Japanese psychiatrists had been confirmed by a case vignette method (Kitamura *et al.* 1984).

2. Questionnaire

The early pregnancy questionnaire included the Eysenck Personality Questionnaire (EPQ) (Eysenck & Eysenck, 1975), the attitudes of the woman and her husband towards the present pregnancy, accommodation variables, social support, and other sociodemographic features. In assessing intimate support, the woman was asked to nominate one best person who would be available in seven situations. An *ad hoc* score of the degree of the husband's intimacy was constructed by counting the number of times that the husband was nominated in response to the seven questions ('Who can you feel happy or free to be with or to do things with?'; 'Who can you ask for help when in trouble?'; 'Who can you talk to openly?'; 'Who can you share your feelings with?'; 'Who depends on and needs you?'; 'Who do you rely on?'; and 'For whom do you feel like doing things as much as you can?'). A higher score indicate a higher level of intimacy.

In the mid-pregnancy questionnaire, the perceived rearing experience was examined by using the Japanese version (Kitamura & Suzuki, 1993*a*) of the Parental Bonding Instrument (PBI) (Parker *et al.* 1979). The original PBI consists of 25 four-point items, assessing parental care and protection. Because the present questionnaire survey involved many sections, the number of PBI items was reduced to 16 (8 care and 8 protection items) which had the highest factor loadings on the two factors in Parker *et al.*'s (1979) original report.

3. Statistical analysis

Any episode of affective disorders of which

Table 1. *Obstetric correlates*

Variables	No PRAD ($N = 101$) N (%)	PRAD ($N = 19$) N (%)	RR	χ^2	P
Total					
No past pregnancy	30 (30)	12 (63)	3·18	6·47	0·011
No past delivery	51 (50)	16 (84)	4·22	6·07	0·014
With past pregnancy					
N	71	7			
No past delivery	21 (30)	4 (57)	2·83	1·14	0·286
Abortion	37 (52)	5 (71)	2·14	0·34	0·561
Miscarriage	23 (32)	0 (0)	0·00	1·85	0·174
Termination of pregnancy	19 (27)	5 (71)	5·63	4·06	0·004
With past delivery					
N	50	3			
Normal spontaneous delivery	39 (78)	3 (100)	infinite	0·03	0·857
Vacuum	5 (10)	0 (0)	0·00	0·00	1·000
Caesarian	7 (14)	0 (0)	0·00	0·00	1·000

PRAD, pregnancy-related affective disorders; RR, relative risk.

onset had been identified during the present antenatal period was termed 'pregnancy-related affective disorder' (PRAD). The sample women were divided into those with and without PRAD. The two groups were compared on a number of predictor variables using the chi-squared test (with Yates's correction) or t test as appropriate. For each variable, its relative risk (RR) was the proportion of the rate of the PRAD among women with, compared to that among women without, the predictor variable. The 95% confidence interval was also calculated (Morris & Gardner, 1988). All statistical analyses were conducted by using the SPSS-X programme (SPSS Inc., 1986).

RESULTS

1. Affective disorders arising among pregnant women

Twenty-one episodes of RDC psychiatric disorders began during the present antenatal period; 13 episodes were RDC major depressive disorder, 6 minor depressive disorders, one other psychiatric disorder (DSM-III, atypical depression), and one obsessive compulsive disorder. One woman developed an episode of minor depressive disorder in the early stage of pregnancy, which remitted but was followed by a new episode of major depressive disorder in the same antenatal period. Since a total of 19 women (16%) started a new episode of affective disorders during pregnancy, they were labelled as the 'pregnancy-related affective disorders' (PRAD). Of the 19 women with the PRAD, 13 (68%) developed it in the first trimester.

Nine women were found to be suffering from mental disorders which had started before the present pregnancy. Their RDC categories were: major depressive disorder 1; minor depressive disorder 1; panic disorder 1; labile personality 1; obsessive compulsive disorder 3; phobic disorder 2; and other psychiatric disorder 4. The total exceeded 9 because of multiple diagnosis among a few women. If these women who had already been RDC cases are excluded from the denominator, the incidence of PRAD is 19% (19/101).

2. Obstetric correlates

Women who developed PRAD had experienced significantly fewer past pregnancies (Table 1) ($\chi^2 = 6{\cdot}47$; $P < 0{\cdot}05$). Those who had experienced no previous pregnancy were approximately three times as likely to develop PRAD as those who had done so (RR 3·18, 95% confidence interval 1·35–7·47). Having experienced no delivery had a RR of 4·22 (95% confidence interval 1·30–13·72) ($\chi^2 = 6{\cdot}07$, $P < 0{\cdot}05$). However, the significant contribution of no past delivery to the development of PRAD disappeared when it was examined only for those having experienced past pregnancy. Among those with past pregnancy, past experience of

termination of pregnancy demonstrated an RR of 5·63 (95% confidence interval 1·17–27·00) ($\chi^2 = 4·06$, $P < 0·05$), whereas a past experience of miscarriage or abortion in general did not prove to be a significant risk factor. Neither did past experiences of vacuum or Caesarian extraction influence the rate of the PRAD. The effect of past termination of pregnancy on the PRAD rate was specific to those without past delivery. Thus, among the women with previous pregnancy, the PRAD was recognized among 27% of those expecting their first baby and with previous termination of pregnancy, while the rate of the PRAD was 3% among the remaining women. The women who met the criteria of (1) no past pregnancies, or (2) past termination of pregnancy and yet no past deliveries, had a combined PRAD rate of 28% (16/57), while for those who did not meet these criteria the rate was 5% (3/63) (RR 5·89, 95% confidence interval 1·81–19·14).

3. Family history of psychiatric disorders

Three of the seven women (43%) with a family history of depressive disorders developed PRAD, whereas 14% (16/113) of those without it did so. The RR of having a relatives with a depressive disorder was 3·03, which was not statistically significant ($\chi^2 = 2·20$, df = 1, $P = 0·138$) (95% confidence interval 1·15–7·98).

4. Early experiences

Loss experience was defined either as loss of father or mother before the age of 16 by death, or separation for 12 months or longer. Statistical significance was reached only for the bereavement from either parent ($\chi^2 = 3·88$, $P < 0·05$). Thus, those bereaved from either parent early in their life (6/22 = 0·27) were twice as likely to develop the PRAD as those without such experiences (13/98 = 0·13) (RR 2·05, 95% confidence interval 0·88–4·79).

The PBI questionnaire was returned by 105 women. The PRAD ($N = 16$) group tended to have lower paternal care than the controls (mean 13·4, S.D. 4·5) *v.* (mean 15·1, S.D. 4·4), ($t = 1·37$, $P = 0·174$) and higher maternal protection than the controls (mean 8·5, S.D. 2·7) *v.* (mean 7·1, S.D. 3·8), ($t = 1·35$, $P = 0·180$), but neither difference was significant.

5. Personality

EPQ neuroticism (N) scores were higher in the PRAD women than in the controls (mean 11·8, S.D. 4·3) *v.* (mean 8·7, S.D. 4·6), ($t = 2·74$, $P = 0·007$), as also were psychoticism (P) scores (mean 4·4, S.D. 2·1) *v.* (mean 3·1, S.D. 1·9), ($t = 2·61$, $P = 0·01$).

Such significant associations between the EPQ scores and PRAD might be due to coexistence of affective disorders at the time of administration of the EPQ (Hirschfeld *et al.* 1987; Katz & McGuffin, 1987; Boyce *et al.* 1990). To examine this possibility, the same analyses were repeated after excluding those women who showed affective disorders (the onset of which was either before or during the present pregnancy) at the first interview (when the EPQ was conducted) as well as those who failed to appear at the second interview. Although differences did not reach a statistical significance, possibly due to the reduction of the number of women (8 with the PRAD and 89 without the PRAD remained), the same trend was observed (neuroticism: $8·4 \pm 4·6$ *v.* $10·8 \pm 5·3$; psychoticism: $2·9 \pm 1·8$ *v.* $3·6 \pm 2·4$ for those without and with the PRAD, respectively).

6. Attitudes towards the present pregnancy

The rate of the present pregnancy 'not desired' among those with the PRAD (16%) was about twice as high as those without the PRAD (8%) (RR 1·84) (95% confidence interval 0·63–5·34), though not reaching statistical significance (Table 2). Asked how subjects had felt when first informed of the present pregnancy, the response of 'no feeling' or 'perplexed' as compared to 'delighted' had a RR of only 1·31 (95% confidence interval 0·54–3·15). However, the combined category of 'no feeling' and 'perplexed' for the husband's response to the news of the present pregnancy had a significant RR of 2·85 (95% confidence interval 1·29–6·28) ($\chi^2 = 5·12$, $P < 0·05$).

7. Demographic and social correlates

The women with and without PRAD did not differ significantly on the following variables: first marriage/remarriage for women and for husbands; the age when married; the duration of premarital escort; arranged *v.* non-arranged marriage; educational level for women and for

Table 2. *Psychological attitudes towards the pregnancy*

Variables	No PRAD ($N = 101$) N (%)	PRAD ($N = 19$) N (%)	RR	χ^2	P
Present pregnancy (missing obs 1)					
Not desired	8 (8)	3 (16)	1·84	0·41	0·521
Own response to the present pregnancy (missing obs 1)					
No feeling/perplexed	25 (25)	6 (32)	1·31	0·10	0·754
Husband's response to the present pregnancy (missing obs 2)					
No feeling/perplexed	16 (16)	8 (42)	2·85	5·12	0·024

PRAD, pregnancy-related affective disorders; RR, relative risk; missing obs, number of missing observations.

Table 3. *Frequency of PRAD by husband's response to the news of pregnancy and intimacy of husband*

Intimacy	Husband's response to the news of pregnancy: Delighted N (%)	No feeling/ perplexed N (%)	Total N (%)
High	9/72 (13)	3/16 (19)	12/88 (14)
Low	2/22 (14)	5/8 (63)	7/30 (23)
Total	11/94 (12)	8/24 (33)	19/118 (16)

husbands; husbands' occupation; women's own occupation; and their annual income.

Living in a flat (apartment house, high-rise flat) ($N = 68$) as compared to living in a detached house ($N = 52$), was found to be significantly related to the occurrence of the PRAD ($\chi^2 = 5{\cdot}71$, $P = 0{\cdot}017$). Those living in a flat (16/68) were four times as likely (RR = 4·08, 95% confidence interval 2·01–8·27) to develop PRAD as those living in a detached house (3/52). When asked whether they thought that their accommodation would be crowded after the birth of the child, a slightly higher proportion of women with PRAD (32%) replied affirmatively as compared to those without PRAD (27%). This, however, had a RR of 1·37 (95% confidence interval 0·55–3·40). Sixty of the women investigated reported that they planned to go back to and stay at the home of origin (where biological parents usually lived) for a short while after the forthcoming childbirth. This custom, called '*satogaeri*', is common in Japanese society. The rate of women who either planned not to do so or had not yet decided was slightly higher among those with PRAD (RR 1·63, 95% confidence interval 0·68–3·91). The interaction of the three variables in the development of the PRAD was of interest. The rate of PRAD appeared to be raised if (a) the woman lived in the flat and (b) they either planned not to go back to the home of origin (i.e. to stay at the flat), or thought that their accommodation would be crowded after the forthcoming childbirth. The rate of PRAD among those who fulfilled these criteria was 29% (12/42) while that among those who did not fulfil the criteria was 6% (4/72) (RR 5·14, 95% confidence interval 1·77–14·92) ($\chi^2 = 9{\cdot}82$, $P < 0{\cdot}01$).

The husband's intimacy score ($\pm$S.D.) tended to be slightly lower for those with PRAD ($4{\cdot}47 \pm 2{\cdot}78$ *v.* $5{\cdot}40 \pm 1{\cdot}86$) though failing to reach statistical significance ($t = 1{\cdot}39$, NS). Although the intimacy of the husband was a poor measure for differentiating PRAD cases from the remainder, it was found to be a predisposing factor to the onset of the PRAD when faced with a negative response of the husband to the news of the present pregnancy (Table 3). A cut-off point of 4/5 of the intimacy score did not predict the frequency of PRAD. When, however, those women with low intimacy from their husband were faced with a negative response of the husband to the news of the present pregnancy (i.e. 'no feeling' or 'perplexed'), they showed an increased rate of PRAD (5/8 = 63%), while the rest of the women did not (14/110 = 13%) (RR = 4·91, 95% confidence interval 3·75–6·43) ($\chi^2 = 10{\cdot}24$, $P = 0{\cdot}001$).

8. Risk factors

To determine the psychosocial variables significantly contributing to the onset of PRAD and the extent to which they did so, the following variables were assigned '1' when assumed to be relevant to the onset of the PRAD and '0' when not relevant: obstetric history; first pregnancy or first delivery with past termination of pregnancy; early parental bereavement; loss of father and/or mother by death before age of 16; high EPQ-P score (a score of $\geqslant 3$); high EPQ N score (a score of $\geqslant 11$); accommodation (living in a flat with either a plan to stay there after the

childbirth or an expectation that the accommodation would be crowded); non-intimate husband (an intimacy score of $\leqslant 4$) and negative response to the present pregnancy. A cut-off point was set against the best balance of sensitivity and specificity for variables with more than two anchor points. The total score of the above variables, i.e. a summation of the scores, was calculated (with a 0–6 range). Due to some missing observations, the numbers of cases with and without PRAD were 19 and 99 respectively. The mean score was 3·5 (S.D. 1·0) and 1·7 (S.D. 1·1) for those with and without PRAD respectively ($t = 6{\cdot}60$, $P < 0{\cdot}000$). Therefore, the women with the PRAD had significantly more risk factors defined here than those without. The rate of PRAD was 0% (0/42) for women with no or one risk factor; 10% (4/39) for those with two risk factors; 20% (4/20) for those with three risk factors; 65% (11/17) for those with four or more risk factors.

DISCUSSION

This study has shown that 16% (19% if the denominator included those women who were free from RDC disorders at base line) of women had a new episode of affective disorders during a 40-week period of pregnancy. Diversity of incidence or prevalence of affective or psychiatric disorders during the antenatal period reported in previous investigations may be explained by the difference in obstetric history of the subjects. For example, the women studied by Cox *et al.* (1982) with a depression incidence as low as 4% contained only 37% of women who had never experienced pregnancy, while those studied by Kumar (1982), who reported an incidence of depression or anxiety of 15%, contained a high rate (71%) of women experiencing their first pregnancy. More than 40% of women studied by Sharp (1988), with a very high prevalence of psychiatric disorder of 29%, had no children, indicating a high rate of first pregnancy. In our study, PRAD was related to both first pregnancy and first delivery combined with previous termination of pregnancy. This may explain the difference of incidence and prevalence of antenatal psychiatric disorders across studies. We recommend that future researchers report incidence of these disorders separately among women with different gravity and parity together with the timing of the onset during an ante-natal period.

An association between PRAD and past induced abortion has already been reported by Kumar & Robson (1984). Previous literature on the psychological aspects of termination of pregnancy has been focused on the psychological sequelae (Pare & Raven, 1970; Hamill & Ingram, 1974; Greer *et al.* 1976; Belsey *et al.* 1977). Almost all those reports found that the termination of pregnancy had inflicted no major impact on the mental health of the women subsequently. However, among 132 pregnant women referred for psychiatric opinion on abortion, Hamill & Ingram (1974) found significant depression in 31%, significant anxiety in 19%, suicidal thought in 11% and other psychiatric symptoms in 8% of them. Among a series of women who had undergone termination of pregnancy, Greer *et al.* found 30% of women presenting psychiatric symptoms and the mean score ($\pm$S.D.) of their Hamilton Rating Scale for Depression was $11{\cdot}7 \pm 6{\cdot}2$. These findings suggest that pregnant women seeking abortion are very likely to suffer from affective disorders. From these and our findings, one may speculate that the termination of pregnancy is associated not only with the depressive disorders just before the termination but also with those during any later pregnancy.

Early parental loss either by death or by other causes has often been described as predisposing to depression in adulthood (for review see Lloyd, 1980; Paykel, 1982). In Kumar *et al.*'s (1984) study, childhood separation from father was significantly correlated with postnatal depression but not with ante-natal depression. In our findings, PRAD was associated with early parental bereavement but not with separation. The phenomenon of early parental loss may have different meanings in different settings. One of the possible mediators between the early loss experience and depression in late life is parenting pattern (Tennant, 1988). Despite a general recognition that the rearing attitudes and behaviours of parents exert remarkable effect upon the psychological development of children and onset of adult psychiatric disorder (e.g. Parker, 1979, 1981*a*,*b*, 1983), the relationship of the PBI scores with PRAD did not reach a statistical significance in the present study.

Correlations with personality are one of the main foci of depression research (for review see Akiskal *et al.* 1983). Studying neurotic and psychotic depressives compared to a normal population, Kendell & DiScipio (1968) found that the N score of the EPQ was significantly higher among both the neurotic and psychotic depressives ($P < 0{\cdot}001$), while the E score was lower only among the neurotic depressives ($P < 0{\cdot}05$). Hirschfeld *et al.* (1983), on the other hand, demonstrated no difference in the N score between recovered depressives and normals, with lower E score among the former. Our results support Kendell & DiScipio's (1968) notion that depression is associated with a higher N score. Furthermore, we noticed the association of depression with a higher P score. The P score has rarely been studied in depression research because of its recent entry into the questionnaire. It is of interest that Kumar *et al.* (1984) found correlations of antenatal depression with EPQ neuroticism and psychoticism, but this correlation disappeared for postnatal depression. Of interest here are the findings of Boyce *et al.* (1991*a*,*b*) that different personality variables exert an impact on the severity of depression at varying times after childbirth. We will discuss this issue in our follow-up study.

The women's and their husbands' attitudes towards the news of the present pregnancy seem important in understanding the aetiology of PRAD. A simplistic expectation is an association of unwanted pregnancy and depression during pregnancy. Lack of correlation between unplanned or unwanted pregnancy and PRAD in this study is inconsistent with Martin *et al.* (1989), who reported that the pregnancy was unplanned among 71% of women with antenatal depression but only in 20% of normal controls. This discrepancy is difficult to explain. However, Martin *et al.* (1989) listed the third or later child as a risk variable for antenatal depression while only 7% of our women were expecting their third child (none their fourth). It may be, therefore, that unplanned pregnancy functions to precipitate PRAD only among those women with two or more children whereas among those with no children or only one child it is the first pregnancy that triggers the onset of PRAD.

Accommodation variables are known to inflict strain occasionally (for review see Kellett, 1989). We observed that living in a flat was more likely to be associated with PRAD than living in a detached house and that having a plan to go back to the home of their biological parents and expectation that their own house or flat would be crowded after the coming childbirth showed a complicated influence on the above association. Women's recognition of overcrowding, or no way to escape from it when in the difficult time of the first few postnatal weeks, seems to enhance the association between flat-living and PRAD. We therefore speculate that it is not overcrowding but the woman's perception of helplessness that mediates the occurrence of PRAD.

Social support is another area of importance in social psychiatry research (Henderson *et al.* 1980, 1981; Henderson, 1981; Brugha *et al.* 1982; Greenblatt *et al.* 1982; Campbell *et al.* 1983; Henderson & Moran, 1983; Brown *et al.* 1986). Of many potential sources of social support, that from a spouse or a co-habitant has been paid special attention, and is often termed intimacy (Eisemann *et al.* 1984; Waring & Patton, 1984; Eiseman, 1985; Matussek & Wiegand, 1985; Hallstrom, 1986; O'Hara, 1986). The present study has shown that PRAD assignment was not affected by expected support in childcare but was influenced by the husband's intimacy. O'Hara (1986) showed that depression in the second trimester was associated with less support from a husband. In the present study, however, the effect of the husband's intimacy appeared marked only when the pregnant women received a negative response from the husband as to the news of the present pregnancy. It may be, therefore, that the presence of a confiding husband buffers the adverse effect of the negative response (Brown *et al.* 1986; Martin *et al.* 1989).

Since our control group comprised those women who were free from any RDC diagnosis and those who were already cases at the baseline, one may well argue that aggregating these two quite different groups would appear unwise. When, however, the data were reanalysed after excluding those RDC cases at the baseline ($N = 9$) from the non-case group, we still found virtually the same results.

Bivariate analyses conducted so far revealed that PRAD status was linked with several predictor variables which may be chronologically ordered. Thus, the women with PRAD were more likely to have lost a parent by death

before age of 16; to have been a worrier; to have been living in a flat with a husband with whom they felt less intimate; to have had no previous pregnancy or a past termination of pregnancy; to have been exposed to the husband's negative response to the news of the present pregnancy; and to have apprehensions that their accommodation would be crowded after the childbirth, or they could not go to their parental home after the childbirth. One may imagine that these predictor variables contribute to the onset of PRAD at different stages of the woman's life and that one variable leads to another, finally resulting in PRAD. It seems easy to speculate that these risk variables form a vicious circle from which a woman, once trapped, cannot escape. This issue awaits further studies with a larger population.

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