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Psychosocial Study of Depression in Early Pregnancy

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Background. The psychosocial correlates of depression during pregnancy were explored.
Method. Pregnant women attending the antenatal clinic of a general hospital (n=1329) received a set of questionnaires including Zung's Self-Rating Depression Score (SDS). SDS high scorers (>49) (the cases: n=179) were compared with low scorers (<38) (the controls; n=343).
Results. The cases were characterised by: first delivery; more nausea, vomiting, and anorexia; more menstrual pains and premenstrual irritability; early paternal loss; lower maternal care and higher paternal overprotection; higher public self-consciousness score; more smoking and use of medication in pregnancy; unwanted pregnancy; negative psychological response to the pregnancy by the woman and husband; poor intimacy by the husband; and having remarried.
Conclusions. Depression in early pregnancy is determined mainly by psychosocial factors.

The psychiatric disorders occurring during pregnancy have attracted the interest of both researchers and clinicians (Cox, 1979; Cox *et al*, 1982; Kumar, 1982; Kumar & Robson, 1984; Watson *et al*, 1984; Campbell, 1988; Cooper *et al*, 1988; Sharp, 1988; Martin *et al*, 1989). Studies on the incidence of antenatal depression have revealed that it is higher than had been thought. Kumar (1982) in the UK reported an incidence of depression or anxiety of 15% among pregnant women. In a Japanese population, Kitamura *et al* (1993) reported that more than 15% of pregnant women experienced the onset of a depressive illness during pregnancy.

Although such incidence figures would warrant further studies of the aetiology of affective disorders arising during pregnancy, few have been undertaken. Studying 162 pregnant women in Nigeria by administering the General Health Questionnaire, Aderibigbe *et al* (1993) found that GHQ 'cases' during pregnancy were associated with recent adverse life events. Kitamura *et al* (1993), interviewing pregnant women in a longitudinal design, found that pregnancy-related affective disorders (PRAD), were more frequent if (a) either this was the first pregnancy or a pregnancy had been terminated in the past with no obstetric deliveries; (b) early parental death had occurred; (c) the woman had a high neuroticism or psychoticism score on the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975); (d) she lived in a flat and either expected to go there immediately after the birth, rather than returning to her home of origin, or expected that the flat would be crowded then, and (e) the husband with low intimacy had shown a negative response to the news of the pregnancy. Although methodologically correct, the small size of the study sample (n = 120) requires the conclusions to be interpreted with caution.

We report a complementary study on the psychological and social correlates of depression seen during pregnancy. Since our previous study and others (Kumar & Robson, 1984) indicated that the prevalence of antenatal depression was during the first trimester, we chose Zung's (1965) Self-rating Depression Scale (SDS) administered in the early phase of pregnancy, as the measuring instrument. Although this questionnaire survey would be less precise diagnostically than a direct interview study, it would have more statistical power, due to a sufficient number of cases and controls.

Method

A total of 1329 women from among attenders at an antenatal clinic in the obstetrics department of a general hospital in Kawasaki, an industrial city in Japan, were invited to participate in a questionnaire survey, when pregnancy had been confirmed by the presence of the foetal heart-beat on echocardiography. Women who were at more than 12 weeks' gestation were excluded, but no other exclusion criteria were applied. Of these 1329 women, usable SDS questionnaires were returned from 1289 (97%).

Questionnaires were distributed three times during the pregnancy – early (when they were recruited), in the middle period (approximately 20 weeks gestation), and late (approximately 34 weeks' gestation). On each occasion, the SDS was used to measure the severity of any depressive syndrome. The other questionnaires administered on each occasion were those described in our earlier paper (Kitamura *et al*, 1993), except for the Eysenck Personality Questionnaire, which was replaced by the Japanese version (Sugawara, 1984) of the Self Consciousness Scale (SC) (Fenigstein *et al*, 1975), distributed on the second occasion.

The questionnaire given in early pregnancy included items concerning the menstrual history, attitudes of the woman and her husband towards the pregnancy, domestic accommodation, social support, intimacy with the husband, and other sociodemographic variables. The menstrual history included two items referring to menstrual pain and premenstrual irritability; these were rated on a scale from never (0), to sometimes (1), often (2), and almost all the time (3).

The mid-pregnancy questionnaire included the Japanese version (Kitamura & Suzuki, 1993) of the Parental Bonding Instrument (PBI) (Parker *et al*, 1979) and the Japanese version of the SCS (Sugawara, 1984). The PBI consists of 25 items. Its two subscales – care and overprotection – concerned maternal and paternal affectionate behaviour and controlling behaviour towards the subject before the age of 16. The total number of items of the PBI was reduced in this study to 16 with the highest factor loadings in Parker *et al*'s (1979) study. The SCS consists of 21 items, each rated from 0 (very unlikely) to 6 (very likely). Two subscales were developed, for private and public self-consciousness respectively. Private self-consciousness refers to attention to own emotion, thought and other internal experiences, while public self-consciousness refers to attention to how his/her dress, behaviour, and speech is viewed by others. Also included were severity of nausea and vomiting and loss of appetite during the pregnancy, each being rated from 0 (none) to 3 (severe). The duration of emesis was assessed from 0 (absent), to 1 (less than 2 weeks), 2 (2 to 4 weeks), 3 (1 to 2 months), and 4 (longer than 2 months). The total score of emesis was calculated by the following formula:

$$\text{Total emesis score} = ((\text{score of nausea and vomiting} + \text{score of loss of appetite}) \times 100)/24$$

Thus, the range of the total score of emesis was 0 to 100.

In order to exclude subjects in the 'grey zone' of the depression screening scale, we selected only: (a) those women with an SDS score of 50 or more, and (b) those with an SDS score of 37 or less; the former were categorised as the cases, whereas the latter were the controls. These cut-off points were based on data reported elsewhere (Kitamura *et al*, 1994), in which a subsample of these women were interviewed to make a diagnosis according to the Research Diagnostic Criteria (RDC; Spitzer *et al*, 1978). The positive predictive value of the cut-off point of 49/50 was 42%, whereas the negative predictive value of the cut-off point of 37/38 was 100%.

The cases and controls were compared on predictor variables, using the χ^2 test (with Yates's correction) or *t*-test as appropriate. All statistical analyses were conducted by using the SPSS–X programme (SPSS Inc., 1986).

Results

Depression in early pregnancy

In a companion paper (Kitamura *et al*, 1993), we estimated the validity figures of the SDS among the interviewed subsample with RDC depressive disorders as the external criterion, and recommended 42/43 as an optimal cut-off point. Its positive and negative predictive values were 25% and 99%, respectively. Of the 1289 women with usable SDS data, 709 scored 42 or less, while 580 scored 43 or more, so that the estimated point-prevalence of depression was 0.118 $((709 \times 0.01 + 580 \times 0.25)/1289)$.

Obstetric correlates

Women with an SDS score of 50 or more on the first occasion ($n = 179$) did not differ from women with an SDS score of 37 or less ($n = 343$) in terms of whether or not this was their first pregnancy, whereas the former were less likely to have experienced a previous obstetric delivery (Table 1). The mean number of previous deliveries was lower among the cases (0.53, s.d. = 0.68) than among the controls (0.68, s.d. = 0.72) ($t = 2.38$, $P = 0.018$). Among those with a previous pregnancy, the rate of having had no previous delivery was still higher among the cases. The rate of abortion (miscarriage or termination of pregnancy), and of termination of pregnancy in particular, was also significantly higher among the cases. Thus, the mean number of previous terminations of pregnancy was significantly higher among the cases (0.72, s.d. = 0.99) than

Table 1
Obstetric correlates and antenatal depression

Variables	Controls (n=343) n (%)	Cases (n=179) n (%)	χ^2	P
Total				
No previous pregnancy	115 (34)	63 (35)	0.08	0.776
No previous delivery	157 (46)	103 (58)	6.05	0.014
With previous pregnancy				
n	228	116		
No previous delivery	42 (18)	40 (35)	10.06	0.002
Abortion	110 (48)	78 (67)	10.44	0.001
Miscarriage	52 (23)	30 (26)	0.24	0.621
Termination of pregnancy	74 (33)	53 (47)	6.71	0.010
With previous delivery				
n	186	76		
Normal spontaneous delivery	146 (79)	69 (91)	4.74	0.030
Vacuum	22 (12)	3 (4)	3.02	0.082
Caesarian	22 (12)	7 (9)	0.16	0.692

among the controls (0.45, s.d.=0.73) (t=2.66, P=0.009). However, the rate of previous terminations of pregnancy did not achieve a statistically significant difference from controls, when examined only among those women with a previous delivery (controls 42/186=0.23; cases 24/76=0.32; χ^2=1.87, P=0.172), although the *number* of previous terminations of pregnancy still showed a difference (controls 0.32, s.d.=0.65; cases 0.61, s.d.=1.11; t=2.12, P=0.036). Of those women who had already had a delivery of one or more babies, the rate of previous normal spontaneous delivery was slightly higher among the cases but this might be explained by the finding that the number of previous deliveries among them was higher than for the controls (controls 1.9, s.d.=1.0; cases 2.2, s.d.=1.4; t=1.78, P=0.079). We reported previously (Kitamura *et al*, 1993) that in the interviewed subsample of 120 women, one of the risk factors for pregnancy-related affective disorder (antenatal depression) was if this was either the first pregnancy or the first delivery with a history of previous termination of pregnancy. The proportion of women who fulfilled this criterion was slightly higher among the cases (94/179=0.53) than among the controls (147/343=0.43); this reached statistical significance (χ^2=4.03, P=0.045), but to a far lesser extent than among the subsample previously reported.

The mean score of nausea and vomiting was significantly higher among the cases (controls 1.0, s.d.=1.0; cases 1.9, s.d.=1.0; t=8.34, P=0.000), as was the score of loss of appetite (controls 0.5, s.d.=0.8; cases 1.2, s.d.=1.1; t=8.17, P=0.000). The total score of emesis was also significantly higher among the cases (controls 20.1, s.d.=22.9; cases 47.4, s.d.=32.2; t=10.32, P=0.000).

Menstrual history

Both the menstrual pain and premenstrual irritability scores were significantly higher among the cases than the controls. Thus, the mean score (s.d.) for menstrual pain was 1.3 (0.6, n=184) among the controls and 1.5 (0.8, n=142) (t=2.71, P=0.007) among the cases, while the mean score (s.d.) of premenstrual irritability was 1.2 (0.5, n=209) among the controls and 1.7 (n=144) among the cases (t=6.45, P=0.000).

Early experiences

As in our previous study (Kitamura *et al*, 1993) and others (Brown *et al*, 1977), early loss experience was defined either as loss of father or mother before the subject's age of 16 by death, or separation for 12 months or longer. Statistical significance was reached here for a loss experience of any type related to the father (Table 2).

Due to some missing observations, the usable data for PBI analyses were: paternal care, controls=278, cases=135; paternal overprotection, controls=271, cases=133; maternal care, controls=283, cases=143; maternal overprotection, controls=281, cases=145. As is seen in Table 3, the women with higher SDS scores showed significantly lower paternal and maternal care scores and significantly higher paternal and maternal overprotection scores.

Table 2
Early loss experience and antenatal depression

Variables	Controls (n=343) n (%)	Cases (n=179) n (%)	χ^2	P
Father				
Death	10 (3)	12 (7)	3.30	0.070
Separation	19 (6)	15 (8)	1.13	0.288
Either	29 (9)	27 (15)	4.73	0.030
Mother				
Death	8 (2)	3 (2)	0.03	0.861
Separation	10 (3)	7 (4)	0.12	0.728
Either	18 (5)	10 (6)	0.00	1.000
Either parent				
Death	17 (5)	15 (8)	1.84	0.175
Separation	22 (6)	19 (11)	2.32	0.128
Either	39 (11)	31 (17)	3.09	0.079

Table 3
PBI scores and antenatal depression

PBI	Controls	Cases	t	P
Father				
Care	16.6 (4.6)	14.4 (4.8)	4.57	0.000
Overprotection	6.2 (3.4)	8.0 (3.8)	4.56	0.000
Mother				
Care	18.7 (4.1)	16.9 (4.3)	4.21	0.000
Overprotection	6.3 (3.9)	7.6 (3.5)	3.59	0.000

Personality

The number of usable SCS data was 292 for the controls and 148 for the cases. The public SCS score was significantly higher among the cases (29.1, s.d. = 6.9) than among the controls (25.3, s.d = 8.0) ($t = 4.89$, $P = 0.000$), while the private SCS score did not differ between the two (controls 30.8, s.d. = 7.6; cases 30.2, s.d. = 6.9; $t = 0.88$, $P = 0.382$).

Alcohol, tobacco, and medication

While the proportion of women who drank alcohol did not differ between the controls (121/343 = 0.35) and the cases (79/179 = 0.44) ($\chi^2 = 3.5$, $P = 0.060$), the cases smoked cigarettes significantly more frequently (controls 40/342 = 0.12, cases 46/176 = 0.26; $\chi^2 = 16.5$, $P = 0.000$). More cases (52/177 = 0.29) than controls (61/341 = 0.18) reported that they had taken medication since the beginning of the pregnancy ($\chi^2 = 9.36$, $P = 0.004$).

Attitudes towards the present pregnancy

The cases were significantly more likely to report that the pregnancy had not been desired, that they had either had no particular feeling about it or felt perplexed when informed of the pregnancy, and that the husband had been the same (Table 4).

Accommodation

Contrary to our previous report (Kitamura *et al*, 1993), in this population the cases and controls did not differ in the rates at which they lived in flats (controls 216/341 = 0.63, cases 117/178 = 0.66; $\chi^2 = 0.20$, $P = 0.659$). The proportion of women who planned to go back to their home of origin for a short while after the forthcoming childbirth ('*satogaeri*') did not differ between the two groups (controls 156/340 = 0.46, cases 72/178 = 0.40; $\chi^2 = 1.19$, $P = 0.276$). A significantly higher proportion of women with high SDS scores thought that their accommodation would be crowded after the childbirth (controls 108/339 = 0.32, cases 74/173 = 0.43, $\chi^2 = 5.49$, $P = 0.019$). In our previous study of the interviewed subsample, we found that the rate of pregnancy-related affective disorder appeared to be raised if: (a) the woman lived in a flat and (b) she planned not to go back to her home of origin, or thought that the accommodation would be crowded after the childbirth. However, in the present extended sample, these criteria did not discriminate the cases from the controls (controls 156/343 = 0.46, cases 94/179 = 0.53; $\chi^2 = 2.06$, $P = 0.151$).

Intimacy of the husband

The husbands' intimacy scores were significantly lower among the cases: the mean score was 5.7 (s.d. = 1.7, $n = 343$) for the controls and 4.8 (s.d. = 2.2, $n = 179$) for the cases ($t = 4.71$, $P = 0.000$). Previously, we reported that the effect of a negative response of the husband towards the news of the pregnancy was more marked when the husband's degree of intimacy was rated as low (Kitamura *et al*, 1993). In accordance with that study, the husbands were divided into high- and low-intimacy groups with a cut-off point of 4/5. The proportion of husbands who showed a negative response to the news of the pregnancy was significantly higher among the cases than among the controls, both in

Table 4
Psychological attitudes towards the present pregnancy and antenatal depression

Variables	Controls n (%)	Cases n (%)	χ^2	P
Present pregnancy not desired	22/337 (7)	33/178 (19)	16.38	0.000
Own response to the present pregnancy				
No feeling/perplexed	55/338 (16)	68/176 (39)	32.62	0.000
Husband's response to the present pregnancy				
No feeling/perplexed	31/341 (9)	50/176 (28)	31.34	0.000

the high- and low-intimacy groups (high-intimacy group, controls 23/271 = 0.09, cases 19/108 = 0.18, $\chi^2 = 5.6$, $P = 0.000$; low-intimacy group, control 8/70 = 0.11, cases 31/68 = 0.46, $\chi^2 = 18.2$, $P = 0.000$), but the impact of the husband's response on the woman's mental health seemed to be stronger among the low-intimacy group.

The proportion of women who said that help would be available either at home or outside after the childbirth did not differ between the controls and cases.

Demographic correlates

The women with high and low SDS scores respectively did not differ significantly on the following variables: age at marriage; duration of premarital association, arranged *v.* non-arranged marriage; educational levels of both women and husbands; religion; and annual income.

The mean age of the cases was slightly but significantly lower (controls 28.5, s.d. = 4.1; cases 27.2, s.d. = 5.0; $t = 2.99$, $P = 0.003$). While the rate of husbands being previously married did not differ between the two groups (controls 14/304 = 0.05; cases 8/162 = 0.05; $\chi^2 = 0.00$, $P = 1.000$), the proportion of remarried women was significantly higher among the cases (controls 6/342 = 0.02; cases 15/176 = 0.09; $\chi^2 = 12.00$, $P = 0.001$). All the remarried women had previously been divorced, rather than widowed. Five of the six remarried control women (83%) and seven of the 156 remarried case women (47%) had a child or children by the ex-husband; this difference did not reach statistical significance.

A higher proportion of the cases had been working in a job outside the home at the time of the first questionnaire study (controls 81/323 = 0.25; cases 56/164 = 0.34), but this difference just failed to reach statistical significance ($\chi^2 = 3.50$, $P = 0.061$).

Risk factors

To determine the psychosocial and clinical variables significantly contributing to the prevalence of antenatal depression, and the extent to which they did so, a discriminant function analysis was carried out, with the case-control status as the dependent variable and the risk factors so far identified as predictor variables. The predictor variables were: previous delivery (no, 1; yes, 0); previous termination of pregnancy (yes, 1; no, 0); severity of emesis (total emesis score); severity of menstrual pain (0 to 3); severity of premenstrual irritability (0 to 3); loss of father before age of 16, either by death or separation (yes, 1 no, 0); four PBI scores; public self-consciousness score; cigarette smoking (yes, 1; no, 0); having taken medication since the beginning of the pregnancy (yes, 1; no, 0); unwanted pregnancy (yes, 1; no, 0); own negative response to the pregnancy (yes, 1; no, 0); husband's negative response to the pregnancy (yes, 1; no, 0); belief that the accommodation would be crowded after the birth (yes, 1; no, 0); husband's degree of intimacy (0 to 7); the woman's age; and remarriage (yes, 1; no, 0); A stepwise method for minimising Wilks' lambda was employed; the best discriminator was entered first, followed by the next best, until all variables adding significant information were entered. Of 179 cases and 343 controls, only 321 were used for a discriminant function analysis due to missing observations. A total of 14 predictors were found to be significant variables. These were: the severity of emesis (standardised canonical discriminant function coefficient 0.73), maternal care score (−0.33), own negative response to the pregnancy (0.28), husband's degree of intimacy (−0.28), public self-consciousness score (0.26), no previous delivery (0.22), the menstrual pain score (0.20), cigarette smoking (0.20), paternal protection score (0.15), unwanted pregnancy (0.14), remarriage (0.14), having taken medication since the beginning of the pregnancy (0.10), husband's negative response to the pregnancy (0.10), and early paternal loss experience (0.09). The canonical correlation was 0.66, and 81% (295/366) of the subjects were classified correctly.

Discussion

The present study seems to have confirmed the previous findings (Kitamura *et al*, 1993), which were based on a direct interview with a smaller subpopulation. Thus, the prevalence of depression during the early phase of pregnancy was associated with it being the first delivery, previous termination of pregnancy, early parental loss of any type, the husband's negative psychological response to the news of the pregnancy, a low degree of intimacy by the husband, and an expectation that the accommodation would be crowded after the childbirth. Furthermore, risk factors were identified which had not been detected in our earlier study, which were having perceived lower paternal and maternal care and higher maternal and paternal overprotection, unwanted pregnancy, a negative psychological response to the news of the pregnancy, younger age, and being remarried. Risk factors that were also confirmed for the first time were: more nausea,

vomiting, and anorexia during pregnancy; more menstrual pain and premenstrual irritability; a higher public self-consciousness score; more frequent smoking and more frequent use of medication since the beginning of the pregnancy. Few findings which were significant in our past study were not confirmed in the present large population; no significant association emerged between the prevalence of antenatal depression and first pregnancy, living in a flat, and not planning to go back and stay at the home of origin after the birth.

The cross-sectional nature of the present research design requires caution when interpreting the results. While our method did not identify those women who developed depression after the first questionnaire survey, we may also have included those who had had depression since some time before the present pregnancy began. However, among the subpopulation of the subjects we directly interviewed, more than 60% of the antenatal depression cases had their onset in the first trimester, whereas only 2 out of 120 women were suffering from depression which had started before the present pregnancy. Thus, virtually all the women with a high SDS score at the first questionnaire survey are likely to have been reasonably representative of cases of antenatal depression. In order to identify the women who developed depression in the later stage of the pregnancy, SDS scores on the second and the third occasions during the pregnancy may have to be used. However, because we observed that the sensitivity and specificity of the SDS varied between the three occasions (Kitamura *et al*, 1994), no fixed-cut-off point of the SDS score can be used for case identification without careful adjustment. In such an analysis, the SDS would be better used as a continuous variable to represent the severity of depression, rather than as a dichotomous variable. Results analysed in this manner will be reported in a companion paper.

Many of the psychological or social correlates of antenatal depression in this study – previous termination of pregnancy (Kumar & Robson, 1984), premenstrual complaints (Graze *et al*, 1990), early parental loss (Lloyd, 1980; Paykel, 1982) affectionless overprotection by the parents during childhood (Parker, 1979, 1981, 1983), unwanted pregnancy (Martin *et al*, 1989), lower intimacy on the part of the husband (Greenblatt *et al*, 1982; Eisemann *et al*, 1984; Waring & Patton, 1984; Eisemann, 1985; Matussek & Wiegand, 1985; Hallstrom, 1986; O'Hara, 1986) – are in line with literature on both antenatal depression and depressive illness in general. These findings may be regarded as supporting the notion that antenatal depression is a type of depressive illness which appears through reaction to stressful situations, in this case, pregnancy.

We also noted that some correlates were specific to pregnancy. Women seemed to be more vulnerable to depression if they were expecting the first baby, had taken medication since the beginning of the pregnancy, had not wanted the pregnancy, and showed a negative response to it. The association of high public self-consciousness with the antenatal depression is of interest. Zajicek (1981) reported that some pregnant women became depressed when they were concerned with change in their body shape. This may be mediated by heightened self-consciousness in a public setting. Women who pay more attention to the way they are seen by others may be more sensitive to the enlargement of the lower abdomen and increased waist-hip ratio (Singh, 1993). This may be a threat to their self-esteem, which is based to a significant extent on the way they look and are seen.

Most of the risk variables identified through bivariate analyses were shown statistically to be significant predictors of their own right. Only a few variables – previous termination of pregnancy, severity of premenstrual irritability, paternal care score, maternal overprotection score, expectation that the home would be crowded, and age – lost significance in predicting antenatal depression in a discriminant function analysis.

One may argue that several psychosocial factors identified as linked to the first-trimester depression may be caused by some higher-order variable such as a perceptual set. The EPQ neuroticism measure may be a useful one to assess it. Since we adopted the SCS in the place of the EPQ, we repeated the discriminant function analysis with the public self-consciousness score forced to enter prior to the other predictor variables. The result was virtually the same only with slight changes of the coefficients of the variables. Thus, it seems unlikely that the perceptual set could explain all the variation of the first-trimester depression.

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