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Social support and pregnancy: II. Its relationship with depressive symptoms among Japanese women

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Abstract

In a questionnaire survey among 1329 first-trimester pregnant women, both the husband support measures and unwanted pregnancy ('stressor' agent in pregnancy) showed significant effects on an elevated score of the cognitive disturbance subscale of the Zung's self-rating depression scale (SDS), while only unwanted pregnancies showed an effect on an elevated score of the dysphoric mood subscale of the SDS. However, no interaction was observed between the husband support measures and unwanted pregnancy, therefore the effect of the husband's social support on the cognitive disturbance score was not that of a buffer, but rather a main effector. Finally, multiple regression analyses showed that the dysphoric mood score was preceded by unwanted pregnancy, premenstrual irritability, public self-consciousness, and maternal overprotection; while the cognitive disturbance score was preceded by unwanted pregnancy, husband reduced 'given' and 'giving' support, maternal reduced care and overprotection, paternal reduced care, low annual income, low private self-consciousness, and smoking. These findings suggest that the husband's support for a pregnant woman is effective only in reducing cognitive symptoms, and that different symptomatic constellations have different sets of psychosocial correlates.

Key words   depression, marriage, parenting, pregnancy, self-consciousness, social support.

INTRODUCTION

Although the perinatal period has long been seen as a stressful situation because of its transitional nature,[1–5] most research has been directed toward the postnatal period, and the puerperium in particular.[6,7] Pregnancy has been understood as a stage when 'normal' psychological reactions may take place, but it is only recently that researchers have considered it as a life-stage of vulnerability of depression and of other types of psychopathology.[8] The reported incidence of depression during pregnancy (antenatal depression) has ranged between 4 and 29%[9,10] but mostly around 15%.[11–16] Its onset is mainly in the first trimester.[14,17] It has been shown that antenatal depression was related to a larger proportion of primiparae,[7] past induced abortion,[13,17] past psychiatric history,[13,16] childhood separation from the father,[13] low paternal care and high maternal protection,[17] high neuroticism score,[13,18] unplanned and unwanted pregnancy,[14] and lack of intimacy of the husband.[14,17] Thus, it seems very likely that the onset of antenatal depression is related to a variety of psychosocial factors. Further studies that clarify the factors and their interaction is suggested.

The importance of social support in the onset of depression is widely recognized.[19–23] For example, studying the onset of depression during pregnancy, Kitamura *et al.* found that the incidence of antenatal depression would be increased if women with a lack of support from the husband faced a negative response of the husband towards the news of the pregnancy;[17] however, if they received a positive response from the husband, it remained, even among women whose husbands gave low level support, as low as that among women with high level support from the husband. Kitamura *et al.* followed the progress of the same women after childbirth, and found that the husband's support was not associated with the incidence of postnatal depression. Thus, the social support necessary to buffer the effects of adversity on the onset of depression may be specific to a particular situation.

Another domain of social support that needs elaboration is its specific link to different symptoms of depression. It has been acknowledged that from the symptomatological perspective, depression is not a homogeneous condition. For example, factor analyses of depression rating scales (e.g. Hamilton's[25] Rating Scale of Depression, Beck Depression Inventory,[26] Zung's Self-rating Depression Scale[27]) have revealed that depression consists of at least three constellations of symptoms.[28–32] Too often investigations have examined the association of social support with either diagnosis or overall severity of depression.[33] It seems unlikely, however, that reduced or

lack of perceived social support interacts with adversity to produce all the symptomatic constellations of depression equally. It may be linked to one or two specific depressive constellations, but not to all of them.

We hypothesized that poor perception of support available from the husband would be linked most strongly to cognitive symptoms, but only moderately or slightly to mood symptoms. Dissatisfaction with social support may be more directly correlated with reduced self-esteem and hence cognitive disturbance.

METHODS

The study methods are described in a companion paper in this issue (p. 30 of this issue).

Participants

The participants were 1329 women attending an antenatal clinic in the obstetric department of a general hospital. The age of the participants ranged from 16 to 42 years (mean = 28.0, SD = 4.3).

Measures

Social support

The Social Support Scale[34] consists of seven items. For each item the subject was asked to nominate one best person to suit the situation. From factor analyses, we set up six composite variables, using three resources of support ('husband', 'premarital', and 'postmarital') and two types of support ('given' and 'giving').

Depression

The self-rating depression scale (SDS) is a self-report measure of the severity of depression. It consists of 20 items, with a 4-point scale.[27] Scores of 1 to 4 were assigned to the four responses in the original SDS, but we reassigned scores of 0 to 3 to the responses of SDS items so that the range of the total SDS score became 0–60.[35] The validity of the Japanese version of the SDS was confirmed.[35]

A factor analysis of the SDS scores among the present sample of women revealed three factors, which were interpretable as the dysphoric mood, cognitive disturbance, and poor concentration (Sugawara M *et al.*, unpubl. data, 1997). The scores of depressive symptom constellations were calculated by adding scores of the items that had high loadings on each factor.

Early experiences

Early loss experience was defined as either death or separation from a parent for 12 months or longer, before the woman was 16 years of age (Sugawara M *et al.*, unpubl. data, 1997).

The Parental Bonding Instrument (PBI)[36] was used to measure how a child viewed the parents' attitudes towards him/her. It has two subscales: 'care' and 'overprotection'. In this study, the subjects were dichotomized above and below the median:

15/16 for paternal care, 6/7 for paternal overprotection, 17/18 for maternal care, and 6/7 for maternal overprotection.

Obstetric history

Obstetric information collected were the age of menarchical onset, menstrual pain and premenstrual irritability.

Personality

The Japanese modification[37] of the self-consciousness scale (SCS)[38] was used. The SCS has to subscales: private self-consciousness and public self-consciousness.

Sociodemographics

The current age, educational level, the current accommodation, the number of people living together were studied.

Health behaviour

As the indicators of the woman's health-related behaviour, we measured the drinking of alcoholic beverages and smoking.

Marriage

The age when married, the type of marriage and the length of pre-marital courting period were noted.

RESULTS

Effects of perceived social support on severity of depression

Since we found the husband to be the source of most of the social support for pregnant women, we then focused only on the possible effects of the husband's support on the severity of symptomatic constellations of depression during the first stage of pregnancy.

One-way analysis of variance (ANOVA) regressed each depressive symptom constellation on each husband support measure (Table 1). We did not employ Pearson correlation coefficients between the symptomatic and husband support measures because latter scores were skewed and because we wanted to identify the cut-off of the measures of the husband's support where a symptom constellation score showed a noticeable jump. Significant differences of scores were found for dysphoric mood and poor concentration by the husband 'giving' support but not for these two symptom constellation scores by the husband 'given' support. The cognitive disturbance score was significantly different between the husband's 'given' and 'giving' supports. A significant jump of the cognitive disturbance scores was observed between 0 point (no husband support) and other points (some husband support) of both 'given' and 'giving' supports. For further analysis, therefore, the women were dichotomized into those with no and some husband 'given' and 'giving' supports.

Table 1. Severity of depressive symptom constellations by the husband supports

Husband support	Dysphoric mood	Cognitive disturbance	Poor concentration
'Given' support			
0 ($n = 106$)	6.36 (1.69)	10.24 (2.44)	8.45 (2.16)
1 ($n = 82$)	6.16 (1.96)	9.63 (2.69)	8.04 (2.01)
2 ($n = 188$)	5.99 (1.69)	9.22 (2.58)	8.09 (2.18)
3 ($n = 241$)	6.06 (1.73)	9.10 (2.35)	7.98 (2.19)
4 ($n = 583$)	5.89 (1.65)	8.61 (2.32)	7.95 (2.12)
$F_{4,1195}$	2.08	12.79	1.31
P	0.0815	0.0000	0.2651
Scheffe test	–	0 > 4,3,2 1 > 4	–
'Giving' support			
0 ($n = 101$)	6.43 (2.09)	10.56 (2.33)	8.63 (2.10)
1 ($n = 124$)	6.15 (1.75)	9.52 (2.61)	8.21 (2.26)
2 ($n = 173$)	5.88 (1.62)	9.17 (2.46)	8.02 (2.08)
3 ($n = 802$)	5.95 (1.65)	8.71 (2.35)	7.93 (2.13)
$F_{3,1192}$	3.00	20.62	3.62
P	0.0296	0.0000	0.0128
Scheffe test	–	0 > 3,2,1 1 > 3	0 > 3

SD figures in parentheses

Husband social support as a buffer

In order to examine whether the role of the husband's support on the pregnant woman's mental health was the overall beneficial effect (main-effect model) or a process protecting persons from adversity (buffering model),[39] we carried out ANOVA on the three depressive symptom constellation scores by each of the two types of husband support measures and by the unwanted and wanted pregnancy. This is because we thought that unwanted pregnancy would be much more stressful than wanted pregnancy.[24] Type I error was controlled by the Bonferroni method to adjust alpha to 0.008 (alpha of 0.05 divided by three (constellations) and by two (support measures)).

Significant main effects of unwanted pregnancy on the cognitive disturbance score were found when interacted with both husband support measures (both $P = 0.000$) (Fig. 1). These two measures also showed significant main effects on the cognitive disturbance scores (both $P = 0.000$). However, the interaction between the unwanted pregnancy and either of the husband support measures was not significant for the cognitive disturbance score.

For the dysphoric mood score, the unwanted pregnancy showed significant main effects (both $P = 0.001$) while the husband support measures did not; the interaction of the pregnancy and the support measure barely made significance for the combination of the husband 'giving' support with the unwanted pregnancy.

Neither main effects nor interaction were significant for the poor concentration score.

Psychological correlates of depressive symptom constellations

In order to examine whether the three depressive symptom constellations (dysphoric mood, cognitive disturbance, and poor concentration) had psychosocial correlates, the same predictor variables used for the psychosocial prediction of perceived social support were used in two-tailed t-test. Type I
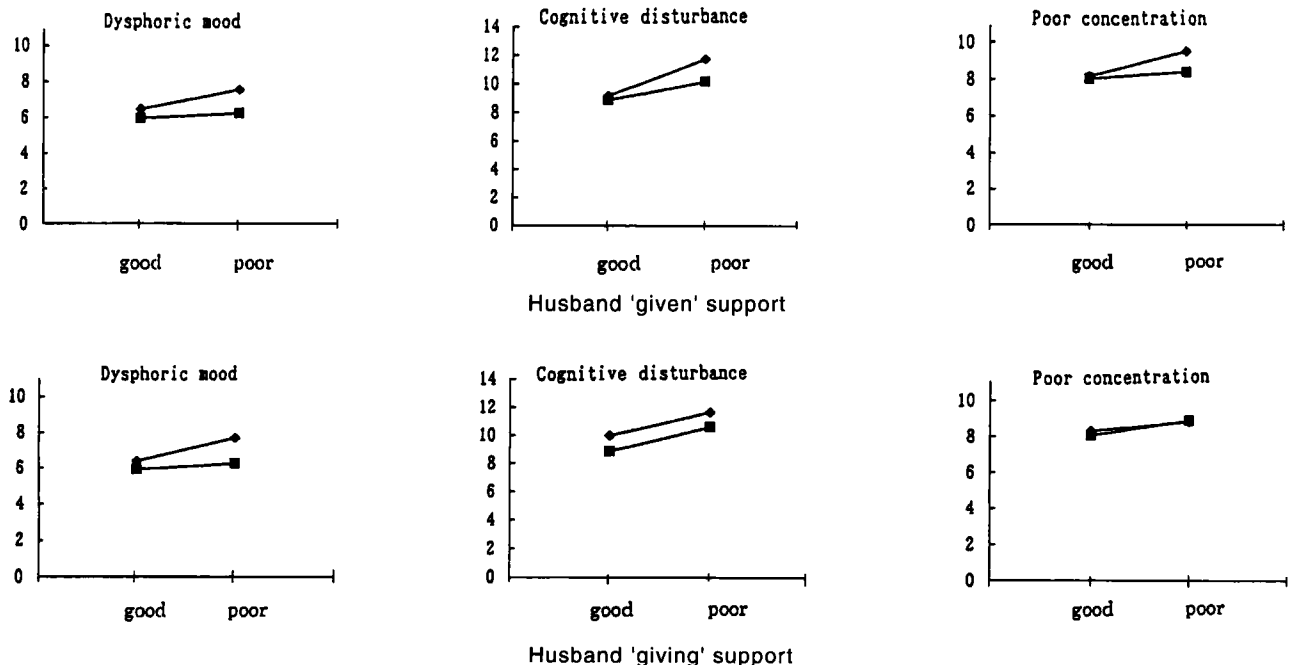

Figure 1. Three depressive symptom constellations by the unwantedness of the pregnancy and the husband's social support. ◆, unwanted pregnancy; ■, other.

Table 2. Prediction of depressive symptom constellations by psychological predictors

	Dysphoric mood	Cognitive disturbance	Poor concentration
Early experiences			
Paternal care			
Low ($n = 458$)	6.06 (1.64)	9.42 (2.39)	8.29 (2.09)
High ($n = 497$)	5.84 (1.64)	8.53 (2.35)	7.68 (2.07)
P	0.040	0.000*	0.000*
Paternal overprotection			
Low ($n = 413$)	5.75 (1.63)	8.46 (2.38)	7.60 (2.06)
High ($n = 545$)	6.12 (1.64)	9.36 (2.29)	8.26 (2.08)
P	0.000*	0.000*	0.000*
Maternal care			
Low ($n = 558$)	5.90 (1.63)	8.51 (2.37)	7.85 (2.10)
High ($n = 431$)	6.08 (1.66)	9.60 (2.30)	8.16 (2.12)
P	0.090	0.000*	0.024
Maternal overprotection			
Low ($n = 547$)	6.18 (1.69)	9.27 (2.30)	8.16 (2.08)
High ($n = 543$)	5.74 (1.60)	8.64 (2.44)	7.81 (2.13)
P	0.000*	0.000*	0.009
Obstetrical variables			
Menstrual pain			
No ($n = 988$)	5.92 (1.67)	8.98 (2.46)	7.93 (2.14)
Yes ($n = 208$)	6.37 (1.81)	9.19 (2.40)	8.48 (2.11)
P	0.000*	0.250	0.001*
Premenstrual irritability			
No ($n = 939$)	5.79 (1.59)	8.89 (2.44)	7.82 (2.12)
Yes ($n = 258$)	6.76 (1.88)	9.45 (2.47)	8.78 (2.07)
P	0.000*	0.001*	0.000*
Personality			
Private self-consciousness			
Low ($n = 526$)	5.85 (1.57)	9.27 (2.37)	8.07 (2.11)
High ($n = 503$)	6.05 (1.72)	8.68 (2.37)	7.89 (2.10)
P	0.057	0.000*	0.171
Public self-consciousness			
Low ($n = 533$)	5.69 (1.49)	8.95 (2.48)	7.79 (2.14)
High ($n = 495$)	6.27 (1.80)	9.05 (2.31)	8.23 (2.06)
P	0.000*	0.498	0.001
Sociodemographics			
Age			
Younger ($n = 586$)	6.13 (1.73)	9.34 (2.57)	8.28 (2.16)
Older ($n = 636$)	5.83 (1.66)	9.17 (2.73)	8.08 (2.24)
P	0.002*	0.254	0.113
Own education			
Up to high school ($n = 853$)	6.04 (1.73)	9.22 (2.45)	8.07 (2.17)
College or more ($n = 341$)	5.89 (1.61)	8.52 (2.39)	7.93 (2.08)
P	0.152	0.000*	0.314
Income			
<2 million yen ($n = 35$)	6.00 (1.97)	10.49 (2.63)	8.34 (2.17)

SD figures in parentheses
*$P < 0.001$.

Table 2. *Continued*

	Dysphoric mood	Cognitive disturbance	Poor concentration
>2 million yen ($n = 1,133$)	5.99 (1.68)	8.95 (2.43)	8.00 (2.14)
P	0.961	0.000*	0.357
Expected crowdedness after childbirth			
No ($n = 817$)	5.88 (1.68)	9.03 (2.63)	8.30 (2.22)
Yes ($n = 483$)	6.10 (1.68)	9.50 (2.59)	8.07 (2.18)
P	0.028	0.002*	0.070
Health behaviour			
Smoking			
No ($n = 971$)	5.91 (1.63)	8.88 (2.38)	7.95 (2.15)
Yes ($n = 218$)	6.34 (1.94)	9.59 (2.67)	8.34 (2.12)
P	0.002	0.000*	0.015

error was controlled with the Bonferroni method to adjust alpha to 0.001 (alpha of 0.05 divided by three (constellations) and again by 30). Table 2 describes only the data of predictor variables with significant findings.

Among the early experiences, low levels of both paternal and maternal care were related to cognitive disturbance, while both paternal and maternal overprotection were related to dysphoric mood and cognitive disturbance. However, early loss experiences were not related to any of the depressive symptom constellations.

While obstetric variables specific to pregnancy and delivery were not related to any of the symptom constellations, the complaint of menstrual pain was related to dysphoric mood and poor concentration, and the complaint of premenstrual irritability to all the three symptom constellations.

As regards personality measures, low personal self-consciousness was related to cognitive disturbance, while public self-consciousness was related to dysphoric mood, and poor concentration.

Youth was related to dysphoric mood, while lower educational level of the woman, lower annual income, and expected crowdedness of the home after the forthcoming birth were all related to cognitive disturbance.

Smoking was related to cognitive disturbance, but drinking was not related to any of the symptom constellation.

None of the variables specific to the marriage was related to the symptom constellations.

The role of social support

The above analyses have demonstrated that unwanted pregnancy was associated with increased severity of dysphoric mood and cognitive disturbance, but not with poor concentration, and that the poor concentration score was only slightly related to the lack of husband support. We also found that dysphoric mood and cognitive disturbance, both being related to the unwanted pregnancy, show association with many, but mostly different predictor variables.

The next question posed was how support from the husband was involved in the increase of dysphoric mood and cognitive disturbance. These supports may simple mediate the effect of the psychosocial predictor variables on the depressive symptoms. Alternatively, the husband's support may have a direct effect on depressive symptoms. We thought that this question would be answered by multiple regression analyses. To this end, we selected: (i) the symptom constellation that showed a significant relationship with the support measure, and (ii) predictor variables that showed a significant relationship with both the social support measure and the symptom constellation. This resulted in: (i) cognitive disturbance (as the symptom constellation), the husband's 'given' support (as the support measure), and premenstrual irritability and lower educational level of the woman (as the predictor variables), and (ii) cognitive disturbance (as the symptom constellation), the husband's 'giving' support (as the support measure), and smoking habit (as the predictor variable). A series of multiple regression analyses was performed. Firstly, the cognitive disturbance score was regressed; the husband's support measure was entered, and then the predictor variables were entered so that it could be seen if the husband support functioned as a mediator. Secondly, the cognitive disturbance was used again as the criterion variable; the predictor variables were entered first, and then the husband support measure, so that it could be seen whether the husband support had an independent effect on the elevated score of the symptom.

In order to predict the cognitive disturbance score, premenstrual irritability ($\beta = 0.072$, $P = 0.0082$) and lower educational level of the woman ($\beta = -1.021$, $P = 0.0002$) showed a significant contribution (r^2 increment = 0.02), even after controlling for the husband 'given' support ($\beta = -0.157$, $P = 0.0000$, $r^2 = 0.03$). The husband's 'given' support made a significant contribution to the prediction of the cognitive disturbance score ($\beta = -0.157$, $P = 0.0000$, r^2 increment = 0.02), even after controlling for premenstrual irritability ($\beta = 0.072$, $P = 0.0082$) and lower educational level of the woman ($\beta = -0.102$, $P = 0.002$) ($r^2 = 0.02$). After controlling for the husband's 'giving' support ($\beta = -0.183$, $P = 0.0000$; r^2 increment = 0.04), smoking still showed a significant contribution ($\beta = 0.107$, $P = 0.001$; r^2 increment = 0.01) to the prediction of the cognitive disturbance score. The husband's 'giving' support contributed significantly ($\beta = -0.183$, $P = 0.0000$; r^2 increment = 0.02) after controlling for smoking ($\beta = 0.107$, $P = 0.001$; r^2 increment = 0.03). Thus the husband's 'given' and 'giving' support measures, although related to menstrual and health behaviour variables, presented independent roles in contributing to the elevated cognitive disturbance score.

Prediction of depressive symptom constellations in the early pregnancy

In order to control for the effect of a possible interaction of variables on the prediction of the depressive symptom constellations, we performed a series of regression analyses with the symptom scores as the criterion variables. In order to predict dysphoric mood, unwanted pregnancy was entered first, and then other variables (i.e. menstrual pain, premenstrual irritability, public self-consciousness, younger age, and maternal and paternal overprotection) were entered stepwise. In order to predict cognitive disturbance, unwanted pregnancy and the two husband support measures were entered first; then other variables (i.e. premenstrual irritability, lower private self-consciousness, the four PBI scores, lower educational level of the woman, lower annual income, and smoking) were entered stepwise (Table 3).

The dysphoric mood score was predicted by unwanted pregnancy, premenstrual irritability, public self-consciousness, and maternal overprotection. Its adjusted r^2 was 0.107. The cognitive disturbance score was predicted by unwanted pregnancy, husband's reduced 'given' and 'giving' support, maternal low-level care and overprotection, paternal low-level care, low annual income, low personal self-consciousness, and smoking. The overall adjusted r^2 was 0.129. Thus, the woman was more likely to present dysphoric mood if she did not want to be pregnant, had experienced premenstrual irritability, was more publicly self-conscious, and had viewed her mother as overprotective. The woman was more likely to present cognitive disturbance if she did not want to be pregnant, viewed her husband as non-supportive or as a target of her care and attention, viewed her mother as affectionless and overprotective, and the child's father as affectionless, suffered from low income, was personally less self-conscious, and had a habit of smoking.

DISCUSSION

Although research has shown that about 10–20% of pregnant women will have an onset of depression during pregnancy,[11-17] its correlates are still controversial. This is also the case for depression in general. A salient finding of our study is that dysphoric mood and cognitive disturbance, two of the main aspects of depressive symptomatology, do not share the same correlates: dysphoric mood is related to public self-consciousness, and premenstrual irritability, while cognitive disturbance is related to lower 'given' and 'giving' supports from the husband, smoking habit, poor parental care, low annual income and low personal self-consciousness. Maternal overprotection is the only predictor that the two symptom constellations shared.

In most investigations of depression and antenatal depression, the criterion variable has been the diagnosis of depression (presence of symptom profiles which meet the diagnostic criteria) or the total score of a depression severity scale. Both the diagnostic criteria for depression, such as the DSM-III-R[40] and the Research Diagnostic Criteria[41] and scales to measure overall severity of depression generally consist of symptom items which include both mood and cognitive symptoms. Thus, the composite variable derived in this manner will be inevitably subject to dilution of significant findings and confounding factors. We believe it would be heuristic value to separate symptom domains in examining psychosocial and possibly biological risk factors.

Table 3. Regression analysis on depressive symptom constellation scores by psychosocial predictors

Regression step	r^2	Δr^2	Standardized β	P
Criterion variable = dysphoric mood				
Step 1				
Unwanted pregnancy	0.006	0.006	0.08	0.0167
Step 2				
Premenstrual irritability	0.111	0.105	0.25	0.0000
Public self-consciousness	–	–	0.13	0.0000
Maternal over-protection	–	–	0.11	0.0003
Adjusted r^2	–	0.107	–	–
Criterion variable = cognitive disturbance				
Step 1				
Unwanted pregnancy	0.050	0.050	0.11	0.0013
Husband 'given' support	–	–	–0.11	0.0018
Husband 'giving' support	–	–	–0.12	0.0011
Adjusted r^2	–	–	–	–
Step 2				
Maternal care	0.139	0.089	–0.13	0.0002
Maternal overprotection	–	–	0.14	0.0000
Paternal care	–	–	–0.10	0.0043
Annual income	–	–	–0.08	0.0116
Private self-consciousness	–	–	–0.08	0.0115
Smoking habit	–	–	0.07	0.0115
Adjusted r^2	–	0.129	–	–

Our results are partly consistent with the notion proposed by others [42–45] that the lack of support from or reduced intimacy of the spouse is linked to the onset of depression. Henderson *et al.* claimed that it is the support from the intimate relationship, but not that from more global social integration that would prevent an individual from having an onset of psychopathology, when faced with negative life events.[46] Since the husband is clearly a very important member of the intimate network of a newly wed woman, it was expected that his support would be linked to antenatal depression among the current sample of women.

Personality has long been a topic of depression research.[47,48] The Neuroticism score of the Eysenck Personality Questionnaire[18] was reported to be higher among depressive patients than among controls,[49] but this was denied by others.[48] Kumar and Robson reported that the Neuroticism score was associated with antenatal but not with postnatal depression, suggesting that a specific personality trait is related to a certain type of depression only.[13] In our study, there was a marked contrast between dysphoric mood, which was related to public self-consciousness, and cognitive disturbance, which was related to low private self-consciousness. Investigators have already demonstrated that depression is linked to high self-consciousness, particularly personal self-consciousness, but the magnitude of this association is usually low.[50–52] The present study indicates that different symptom domains are linked to different facets of self-consciousness. It is also possible that the specific personality-symptom domain relationship exists only in a specific situation because publicly self-conscious women may have elevated dysphoric mood only during pregnancy due to the actual or expected disfiguration of the body shape.[53] In a follow-up study of pregnant women, we found that it was not the public but the personal self-consciousness that was associated with the occurrence of depression after the childbirth (Kitamura T *et al.*, unpubl. data, 1997). Future study should shed light on the specificity of the relationship between personality traits contexts of the situation, and symptom domains.

Early human experiences are another important area of intensive research.[54] Much attention has been paid to the link between perceived early parental behaviour and depression in adulthood.[32,55–59] Using the PBI, Parker and his colleagues[60–62] reported that patients with depression of a neurotic type were characterized by poor parental care and overprotection, although its specificity to depression was questioned.[63] However, the findings have not always been consistent. Again, our study showed that the two symptom domains contradicted one another; maternal and paternal low-level care were related only to cognitive disturbance, whereas maternal overprotection was related to both dysphoric mood and cognitive disturbance. Therefore, the pattern of a significant relationship between perceived parenting and the adult onset of depression may be dependent on the profile of symptoms of the subjects in the sample. In addition to the role of precipitation of depression, poor parenting in childhood may have pathoplastic effects when the subject suffers from depression.

Although research showed that early loss of a parent was linked to adult depression[43,64,65] and suicidal behaviour,[66–69] we did not find a significant association between parental loss in childhood and depressive symptom constellations in early

pregnancy. The association of the two reported in the literature may be spurious, due to a possible association of the early parental loss experience with poor perceived parenting, which has an impact on the likelihood of adult depression. For example, studying community cases of depression, Oakley-Brown et al. found that the contribution of the early loss experience lost its significance when controlled for adverse parenting.[70] By using a direct interview method, Harris et al. found that the effects of a loss of mother (either by death or by separation of one year or more) on the incidence of adult depression were mediated by lack of parental care during childhood.[71] It is also of interest that Colletta reported that compared with the parenting of the mother of an intact family, that of a divorced mother was poorer only when coupled with financial difficulty, which was likely, but not always, to be caused by the father's (husband's) absence.[72]

It is known that social disadvantage is associated with a higher risk of depression.[73,74] Low annual income, which was shown in our study to have a relationship with cognitive disturbance, may be an indicator of the overall social disadvantage that the woman was placed in. Lower educational level of the woman and an expectation that the home would be crowded after the forthcoming birth, both of which showed a significant relationship with cognitive disturbance through bivariate analyses, lost significance in the multiple regression analysis which controlled for the effect of the annual income. Although the housing condition[75,76] and the crowdedness of the home [77–83] were reported to have a relationship with physical and mental ill-health, our study has shown that it is perhaps the overall social disadvantage, rather than the specific aspect of housing condition or population density, that has a causal relationship with the onset of depression.

The premenstrual tension syndrome, renamed as Late Luteal Dysphoric Disorder (LLDD)[40] has been known to be linked with the occurrence of major depression.[84–87] This was measured by a single item (irritability before menstruation) in this study, so that there should be caution in interpreting the findings. Premenstrual irritability was, however, linked to dysphoric mood, but not to cognitive disturbance. Since the premenstrual tension syndrome and antenatal depression may share endocrinological changes, it may be hypothesized and deserves further study that the dysphoric mood of antenatal depression is underlaid by hormonal pathophysiology.

As noted, past investigators used either diagnostic criteria or rating scales for the study of depression. Despite ample evidence of the multifaceted nature of depressive symptoms, few studies have examined the differential correlates of symptom constellations. Our study demonstrated that the depressive symptom constellations had different correlates among first-trimester pregnant women. Recently, Tennen et al. have suggested that researchers should examine not only total scores, but also the subscale scores of depression rating instruments.[33] Any inconsistency found in the literature may perhaps be resolved by separate examination of the different symptom constellations.

A drawback of our study is the cross-sectional nature of the research design. The subject's mood and cognitive state may

bias her report of predictor variables. The symptom constellations may actually precede the 'predictors'. For example, long-lasting cognitive disturbance may have resulted in marital disharmony, and thus poor support from the husband. Significant associations found in this study may be confounded by some variables which remain unidentified. These problems may be partly overcome by adopting a longitudinal design, in that pregnant women who scored low in the depression constellation assessments in early pregnancy would be followed-up throughout pregnancy. We are at process of undertaking such a study.

Although it goes beyond the scope of this paper, there seems to be a possibility that depression in different situations may have different correlates. As regards perinatal depressions, Aderibigbe et al. reported that cases of antenatal and postnatal depression do not overlap more than by chance.[88] Kumar and Robson found that it was only antenatal, but not postnatal depression that showed significant association with the Neuroticism score.[13] It was found that while public self-consciousness was associated with antenatal depression, personal self-consciousness was associated with postnatal depression (Sugawara M et al., unpubl. data, 1997). They also showed that antenatal depression might be buffered by the support of the husband, but that postnatal depression might be buffered by the support of the mother-in-law. If depression in different situations is precipitated by different stressors, it is likely that different sources and types of social support variably buffer its onset, and that individuals with different personality traits are vulnerable at times. Future study should focus on the combination of risk factors, rather than on the main effect of each risk factor.

What also remains for further investigation is the mediator between poor parenting and adult depression, which are separated by a gap of more than a decade. A possible candidate for such a mediator is the child's own temperament and behavioural characteristics.[89–96] However, so far little empirical evidence on this has been accumulated.

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