

福島県立医科大学 学術機関リポジトリ



Title	Support-seeking behavior among Japanese mothers at high-risk of mental health problems: a community-based study at a city health center
Author(s)	Ngoma, Alain M; Goto, Aya; Suzuki, Yuriko; Tsutomi, Hiroshi; Yasumura, Seiji
Citation	Fukushima Journal of Medical Science. 58(2): 117-126
Issue Date	2012
URL	http://ir.fmu.ac.jp/dspace/handle/123456789/339
Rights	© 2012 The Fukushima Society of Medical Science
DOI	10.5387/fms.58.117
Text Version	publisher

This document is downloaded at: 2024-04-20T02:11:25Z

[Original Article]

SUPPORT-SEEKING BEHAVIOR AMONG JAPANESE MOTHERS
AT HIGH-RISK OF MENTAL HEALTH PROBLEMS :
A COMMUNITY-BASED STUDY AT A CITY HEALTH CENTER

ALAIN M. NGOMA¹⁾, AYA GOTO¹⁾²⁾, YURIKO SUZUKI³⁾,
HIROSHI TSUTOMI⁴⁾ and SEIJI YASUMURA¹⁾

¹⁾Department of Public Health, Fukushima Medical University School of Medicine, Fukushima, Japan,

²⁾Department of Global Health and Population, Harvard School of Public Health, Boston, USA, ³⁾Department of Adult Mental Health, National Center of Neurology and Psychiatry, Tokyo, Japan, ⁴⁾Faculty of International Relations, University of Shizuoka, Shizuoka, Japan

(Received April 23, 2012, accepted September 18, 2012)

Abstract : Aim : The aim of this small-scale study is to explore support-seeking behavior among mothers at high-risk of mental health problems on community basis in Japan.

Methods : A survey using one month home visit data was conducted among mothers who registered their pregnancy at Shirakawa City Health Center, Fukushima, from April to September 2010. Probable postpartum depression at one month postpartum was assessed using the Japanese version of the Edinburgh Postnatal Depression Scale and the mother's bonding to her child at one month postpartum was measured by the Bonding Questionnaire.

Results : A total of 118 out of 217 registered mothers were available for analysis. The proportion of probable depression among first time and experienced mothers was 12% and 3%, and that of low bonding was 43% and 13%, respectively. Factors that showed significant associations with probable depression and/or low-bonding among first-time mothers were financial difficulty, obstetrical problems, unhappy feeling towards pregnancy, younger maternal age, later gestational week at registration ; associated factors among experienced mothers were financial difficulty and obstetrical problems. At the time of pregnancy, 35 (90%) of first-time mothers and 22 (31%) of experienced mothers expressed the intention to attend antenatal classes. None of the risk factors for probable depression or low-bonding were associated with the mother's intention to attend antenatal classes in this study.

Conclusion : Pregnancy history, obstetrical problems, sociodemographic information and maternal feeling toward pregnancy should be carefully screened in antenatal phase, and those at risk of postpartum mental health problems should be screened and actively invited to antenatal classes.

Key words : Postpartum depression, Japan, prenatal care

INTRODUCTION

It is now established that the months during pregnancy and following childbirth are frequently characterized by mental health problems with extreme cases of psychiatric disorders¹⁾. In Japan, a government report stated that the prevalence of

probable postpartum depression was 10%, and at one-month postpartum, 18% of mothers lacked confidence in child-rearing while 4% felt they were abusing their children²⁾. More than half a century has passed since researchers shed light on the impact of maternal health problems on infants identified mostly in terms of psychosocial and emotional

Alain M. Ngoma, 後藤あや, 鈴木友理子, 津富 宏, 安村誠司

Corresponding author : Alain M. Ngoma E-mail address : docalain@fmu.ac.jp
<https://www.jstage.jst.go.jp/browse/fms> <http://www.fmu.ac.jp/home/lib/F-igaku/>

development^{3,4)}. Subsequently, a large body of literature documented the effects of psychiatric disorders such as depression, anxiety, panic disorder or obsessive-compulsive disorder on mothers' interactions with their infants and on their infants' social and emotional functioning⁵⁾.

There is, therefore, considerable potential for interventions aimed at promoting the psychosocial well-being of the mother. Such interventions may reduce both the disruption to the child's emotional, educational, and social adjustment, and the demand for health and welfare/social services⁶⁾. Mental health promotion is now a priority and support for parents is recognized as an important element of public health policy in Japan through a program called "Sukoyaka (meaning "healthy and happy" in Japanese) Family 21"²⁾. The program acts as a measure to address the declining birth rate, and to form the basis for an environment where giving birth to children is free from anxiety and in which, parents can raise their children in good health.

Over the past decade, there has been expansion of group-based parenting programmes⁷⁾. However, previous studies on support-seeking behavior of mothers that were conducted outside Japan (United Kingdom, United States) report that these programs would attract least in need—that is, those from highly educated "middle class" families with little evidence of child behavior problems, while uptake would be poor among families most in need^{8,9)}. Recently, a group of researchers importing an Australian postnatal parenting program called Triple P, reported that the Japanese mothers' intention to participate in the program was largely influenced by program features, along with parent-perceived child behavior problems, parental relationships and mothers' education¹⁰⁾. The Positive Parenting Program (Triple P) is a multi-level community-wide program to prevent and offer treatment for severe behavioral, emotional and developmental problems in children aged 0 to 16 years, through enhancing the knowledge, skills and confidence of parents¹¹⁾. Triple P incorporates five levels of interventions on a tiered continuum of increasing intensity. Accumulating scientific evidence supports effectiveness of Triple P, however, its implementation requires drastic reform of existing service framework. Also, Sato and colleagues evaluated a newborn home-visiting program in Japan and found that a higher proportion of mothers with child-rearing anxiety were visited by public health nurses¹²⁾. The Triple P study was conducted among volunteers and Sato's data reflected public health nurses' selection of mothers to provide the

home-visitation service. More importantly, no study has focused on pregnant women's intention to attend antenatal parenting program.

While postnatal support services including the above mentioned Triple P Program, which is a multi-level community-wide program, are actively implemented in Japan, the only widely provided service in the antenatal phase in Japan is the antenatal classes. These classes are organized at both hospitals and health centers. Mothers generally attend the classes at hospitals where they decide to give birth, but these classes given by midwives generally provide instructive lectures about birth and newborn care. Thus municipal health centers staffed with public health nurses are seeking ways to focus more on providing professional support to mothers at risk of parenting difficulties. As the first step toward systematizing the antenatal support service, we aimed to explore formal support-seeking behavior among mothers at high-risk of mental health problems on community basis in Japan.

PARTICIPANTS AND METHODS

The survey using one month home visit data was conducted among mothers, who registered their pregnancy at Shirakawa City Health Center, Fukushima, from April to September 2010. In Japan, a mother is required to report her pregnancy and childbirth to a municipal office, which maintains health files of the children. Children and their parents are subsequently invited to home-visits and child health checkups organized by their municipalities. All data were copied from children's health files kept at the city health center and for analysis we used only mothers with one-month data available. We developed a dataset including mother's socio-demographic (age, marital status, family structure, employment status, financial difficulty), obstetrical (number of past births, gestational week at pregnancy registration, obstetrical problems), child related (sex and gestational age at birth), mental health and parenting items (feeling about pregnancy, anxiety or worries at registration, parenting support, intention to attend antenatal classes, depression and mother-child bonding). Most items were extracted from pregnancy registration records except financial difficulty, obstetrical problems, depression and bonding derived from one month home-visit record. Of note, some of the one-month data were recorded when mothers visited health centers mostly for the care of elderly children. First, we analyzed factors associated with probable postpartum depression and

mother-child bonding. Our conceptual framework places the bonding disorder as a consequence of postpartum depression following previous studies showing that postpartum depression elicits negative clinical implications for maternal-infant attachment^{13,14)}. As for the factors side, our specific focus here is the information that could be screened in the antenatal phase. Second, we analyzed factors associated with mother's willingness to attend the antenatal classes to compare with the risk factors of depression and bonding disorder.

Probable postpartum depression at one month postpartum was assessed using the Japanese version¹⁵⁾ of the Edinburgh Postnatal Depression Scale (EPDS)¹⁶⁾. This is a 10-item self-reporting scale which is valid for use with child-bearing women, and it is highly effective from the viewpoint of sensitivity and specificity^{16,17)}. Each item is scored on a 4-point scale from 0 to 3, with the minimum and maximum total scores being 0 and 30 points, respectively. Classification of women with a score of 13 or higher as the high-score group is very useful for identifying women with probable postpartum depression, especially in Western populations. A score of 9 or higher, however, has been established as a cut-off point for probable depression in Japanese women¹⁵⁾.

Mother's bonding towards her child at one month postpartum was measured by the Bonding Questionnaire developed by Kumar and translated by Yoshida¹⁸⁾. The score of this 10-item scale ranges from 0 to 30, and the higher score indicates lower bonding. There is no decisive cut-off value for this indicator, and we dichotomized the total score by a quartile value of 1; a score of 0 to 1 was classified as "high-bonding" and a score of 2 or higher as "low-bonding". The formal support-seeking behavior was assessed by mother's intention to attend antenatal classes at the time of pregnancy registration.

Survey data were analyzed using STATA statistical software, version 8 for Windows (Stata Corporation, College Station, TX). Spearman's correlation was used to investigate the correlation between probable depression (in score), mother-child bonding (in score) and mother's intention to attend antenatal classes (yes or no). We used Chi-square or Fisher's exact test to investigate factors associated with probable depression status, bonding status, and mother's intention to attend antenatal classes. Since the first-time motherhood is a well-known risk factor of mother's mental health disorders and parenting experience greatly differs

between the two groups we conducted parity-specific analysis stratifying women into first-time and experienced mothers^{19, 20)}.

The current survey was conducted as a part of both the public health activities with an approval from the Shirakawa City health center and an intervention study approved by the Fukushima medical university institutional review committee (Number 1079). We worked in accordance with the Ethical Guidelines for Epidemiological Studies established by the Japanese government.

RESULTS

The total number of mothers with one-month data was 118 (54%) out of 217 mothers who registered their pregnancy. When comparing registered mothers with and without the one-month data, proportions of first-time mothers and those with anxiety or worries at pregnancy registration were significantly higher among those without the data; 36% (with data) and 55% (without data) for the first-time motherhood, and 33% and 54% for the anxiety, respectively. Median age of 118 mothers in the dataset was 29, 36% were first-time mothers, 97% married and 62% employed (Table 1).

The total prevalence of probable depression was 6%, and median bonding score was 0 ranging from 0 to 8 (Table 2). These numbers were higher among first-time mothers. At the time of pregnancy, 35 (90%) of first-time mothers and 22 (31%) of experienced mothers expressed the intention to attend antenatal classes. While probable depression and low-bonding were positively correlated with a statistical significance among first-time mothers and with a borderline significance among experienced mothers, they had no correlation with intention to attend antenatal classes among both first-time and experienced mothers (Table 3).

Table 4 shows the associations of intention to attend antenatal classes, probable depression and low-bonding with background characteristics among first-time mothers. Three dependent variables are listed in columns, and proportions of analyzed factors in rows as shown in the table. For example, 55% of mothers aged 29 years or younger were with low-bonding, while 16% of older mothers were with the outcome, and the association between the age and the bonding was significant. None of risk factors of probable depression and/or low-bonding nor other factors were significantly associated with mother's intention to attend antenatal classes. Regarding probable depression, financial difficulty,

Table 1. Characteristics of subjects

Items [†]	<i>N</i> (%) [‡] <i>N</i> =118
Socio-demographic items	
Age	
≤29 years	57 (48)
>29 years	61 (52)
Marital status	
Single	4 (3)
Married	114 (97)
Family structure	
Extended	15 (22)
Nuclear	52 (78)
Employment status of mother	
Unemployed	45 (38)
Employed	73 (62)
Financial difficulty	
Yes	28 (24)
No	89 (76)
Obstetrical items	
Number of past births	
0 (first-time mother)	42 (36)
≥1 (experienced mother)	76 (64)
Gestational week at pregnancy registration	
≥12 week	18 (15)
<12 week	100 (85)
Obstetrical problems	
Present	11 (9)
Absent	107 (91)
Child related items	
Sex of infant	
Female	32 (48)
Male	34 (52)
Gestational age	
<37 week (preterm)	3 (4)
≥37 week	64 (96)
Mental health and parenting items	
Feeling about pregnancy	
Happy	74 (63)
Surprised, worried, or no feeling	43 (37)
Anxiety or worries at registration	
Yes	39 (33)
No	78 (67)
Parenting support	
Absent	3 (3)
Present	113 (97)

[†]Information of listed characteristics were collected at the time of pregnancy registration except financial difficulty and obstetrical problems collected at one-month home visit.

[‡]Totals across columns for some items do not add up to the total number (*N*) indicated in the top row because of missing data.

Table 2. Mothers' intention to attend antenatal classes, depression and bonding

	<i>N (%)[†] or Median (min, max)</i>		
	Total <i>N=118</i>	First-time mothers <i>N=42</i>	Experienced mothers <i>N=76</i>
Intention to attend antenatal classes at pregnancy registration			
Have intention	57 (52)	35 (90)	22 (31)
No intention	53 (48)	4 (10)	49 (69)
Depression at one month postpartum (score) [‡]	2 (0, 21)	4 (0, 21)	1.5 (0, 15)
0-8	110 (94)	36 (88)	74 (97)
≥9	7 (6)	5 (12)	2 (3)
Bonding at one month postpartum (score) [§]	0 (0, 8)	1 (0, 8)	0 (0, 6)
0-1	90 (76)	24 (57)	66 (87)
>1	28 (24)	18 (43)	10 (13)

[†]Totals across columns for some items do not add up to the total number (*N*) indicated in the top row because of missing data.

[‡]Depression was measured by the 10-item Edinburgh Postnatal Depression Scale (EPDS). The score of 9 or higher indicates probable depression among Japanese mothers.

[§]Mother's bonding towards her child was measured by the 10-item Bonding Questionnaire. The score ranges from 0 to 30, and the higher score indicates lower bonding.

Table 3. Correlation between probable depression[†], mother-child bonding[‡] and mother's intention to attend antenatal classes[§]

First-time mothers	rs	P Value [¶]
Depression-Bonding	0.47	0.002
Depression-Intention	-0.25	0.12
Bonding-Intention	0.03	0.85
Experienced mothers	rs	P Value
Depression-Bonding	0.21	0.06
Depression-Intention	0.03	0.79
Bonding-Intention	0.07	0.28

[†]Depression was measured by the 10-item Edinburgh Postnatal Depression Scale (EPDS). The score ranges from 0 to 30, and the higher indicates a higher level of probable depression.

[‡]Mother's bonding towards her child was measured by the 10-item Bonding Questionnaire. The score ranges from 0 to 30, and the higher score indicates lower bonding.

[§]1=Yes ; 0=No.

[¶]Spearman's correlation was used

obstetrical problems and not being happy about the pregnancy were associated. As for low-bonding, younger age, financial difficulty and pregnancy registration at 12 weeks or beyond were associated.

Table 5 shows the results of the same analysis as Table 4 among experienced mothers. Like in first-time mothers, none of risk factors of probable depression and/or low-bonding were significantly associated with mother's intention to attend antena-

tal classes. However, the association between the employment and the intention to attend antenatal classes was statistically significant ($P=0.04$), and higher proportion of employed mothers had no intention to attend the antenatal classes (Table 5). Obstetrical problems were the only associated factor for the probable depression and financial difficulty for the low bonding.

Table 4. Association of probable depression, low bonding and no intention to attend antenatal classes with background characteristics among first-time mothers

	N (%) [†]			
	Total N=42 (100)	No intention N=4 (10)	EPDS ≥9 [‡] N=5 (12)	Bonding ≥2 [§] N=18 (43)
Socio-demographic items				
Age				
≤29 years	29 (100)	3 (11)	4 (14)	16 (55)*
>29 years	12 (100)	1 (9)	1 (8)	2 (16)
Marital status				
Single	1 (100)	0 (0)	0 (0)	1 (100)
Married	40 (100)	4 (11)	5 (13)	17 (42)
Family structure				
Extended	6 (100)	2 (33)	1 (20)	4 (67)
Nuclear	15 (100)	1 (8)	4 (27)	9 (60)
Employment status of mother				
Unemployed	9 (100)	2 (22)	1 (11)	5 (50)
Employed	32 (100)	2 (7)	4 (13)	13 (41)
Financial difficulty				
Yes	10 (100)	2 (20)	3 (30)*	7 (70)*
No	31 (100)	2 (7)	2 (6)	11 (34)
Obstetrical items				
Obstetrical problems				
Present	5 (100)	1 (20)	2 (40)*	1 (20)
Absent	36 (100)	3 (9)	3 (8)	17 (46)
Gestational age at registration				
≥12 weeks	3 (100)	1 (25)	1 (33)	4 (100)*
<12 weeks	38 (100)	3 (9)	4 (11)	14 (36)
Child related items				
Sex of infant				
Female	9 (100)	1 (13)	1 (11)	4 (44)
Male	11 (100)	2 (20)	4 (36)	8 (73)
Gestational age				
<37 weeks	0 (00)	—	—	—
≥37 weeks	21 (100)	3 (16)	5 (25)	13 (62)
Mental health and parenting items				
Feeling about pregnancy				
Surprised, worried, or no feeling	13 (100)	2 (17)	4 (31)*	5 (38)
Happy	28 (100)	2 (7)	1 (4)	13 (45)
Anxiety or worries at registration				
Yes	19 (100)	2 (11)	2 (11)	8 (40)
No	22 (100)	2 (10)	3 (14)	10 (46)
Parenting support				
Absent	1 (100)	0 (0)	0 (0)	0 (0)
Present	39 (100)	4 (11)	5 (13)	17 (43)

[†]Totals across columns for some items do not add up to the number (N) indicated in the top row because of missing data. Proportions in rows are calculated separately for three outcomes (depression, bonding and intention) by using the total numbers in the very left column as denominators.

[‡]Depression was measured by the 10-item Edinburgh Postnatal Depression Scale (EPDS). The score of 9 or higher indicates probable depression among Japanese mothers.

[§]Mother's bonding towards her child was measured by the 10-item Bonding Questionnaire. The score ranges from 0 to 30, and the higher score indicates lower bonding.

*P<0.05 ; Chi-square or Fisher's exact test was used.

Table 5. Association of probable depression, low bonding and no intention to attend antenatal classes with background characteristics among experienced mothers

	<i>N (%)[†]</i>			
	Total <i>N</i> =76 (100)	No intention <i>N</i> =49 (69)	EPDS $\geq 9^{\ddagger}$ <i>N</i> =2 (3)	Bonding $\geq 2^{\$}$ <i>N</i> =10 (13)
Socio-demographic items				
Age				
≤29 years	28 (100)	18 (75)	1 (4)	4 (14)
>29 years	48 (100)	31 (66)	1 (2)	6 (13)
Marital status				
Single	3 (100)	3 (100)	0 (0)	0 (0)
Married	73 (100)	46 (66)	2 (3)	10 (14)
Family structure				
Extended	9 (100)	6 (67)	1 (11)	1 (11)
Nuclear	37 (100)	23 (70)	1 (3)	3 (8)
Employment status of mother				
Unemployed	35 (100)	18 (56)*	0 (0)	2 (6)
Employed	41 (100)	31 (79)	2 (5)	8 (20)
Financial difficulty				
Yes	18 (100)	11 (69)	0 (0)	5 (28)
No	57 (100)	38 (69)	2 (4)	5 (9)*
Obstetrical items				
Obstetrical problems				
Present	6 (100)	4 (67)	1 (17)	1 (17)
Absent	70 (100)	45 (69)	1 (1)*	9 (13)
Gestational age at registration				
≥12 weeks	14 (100)	10 (83)	0 (0)	1 (7)
<12 weeks	62 (100)	39 (66)	2 (3)	9 (15)
Child related items				
Sex of infant				
Female	23 (100)	15 (68)	0 (0)	0 (0)
Male	23 (100)	14 (70)	2 (9)	4 (17)
Gestational age				
<37 weeks	3 (100)	0 (0)	0 (0)	0 (0)
≥37 weeks	43 (100)	29 (69)	2 (5)	4 (9)
Mental health and parenting items				
Feeling about pregnancy				
Surprised, worried, or no feeling	30 (100)	18 (60)	0 (0)	3 (10)
Happy	45 (100)	31 (76)	2 (4)	6 (13)
Anxiety or worries at registration				
Yes	19 (100)	9 (53)	0 (0)	4 (21)
No	56 (100)	39 (74)	2 (4)	6 (11)
Parenting support				
Absent	2 (100)	1 (50)	0 (0)	0 (0)
Present	73 (100)	47 (69)	2 (3)	10 (14)

[†]Totals across columns for some items do not add up to the number (*N*) indicated in the top row because of missing data. Proportions in rows are calculated separately for three outcomes (depression, bonding and intention) by using the total numbers in the very left column as denominators.

[‡]Depression was measured by the 10-item Edinburgh Postnatal Depression Scale (EPDS). The score of 9 or higher indicates probable depression among Japanese mothers.

[§]Mother's bonding towards her child was measured by the 10-item Bonding Questionnaire. The score ranges from 0 to 30, and the higher score indicates lower bonding.

**P*<0.05 ; Chi-square or Fisher's exact test was used.

DISCUSSION

Prevalence of probable depression (6%) was lower in the present study compared with previous reports from Japan ranging from 11% to 14%^{21,22}. One of possible reasons is that women in our dataset were those who agreed to have home visit by nurses and were likely to have positive attitudes in parenting. Also, mothers who were pregnant for the first time or expressed anxiety or worries at pregnancy registration were underrepresented in this dataset, which might further contribute to the lower prevalence. One methodological explanation for the overrepresentation of experienced mothers among those with the one month data is that city public health nurses asked them to fill out the form when mothers visited the center for the care of elder children as mentioned in the methods section.

It was noteworthy that financial difficulty was commonly associated with probable depression among both first-time and experienced mothers. The factor was associated with low bonding as well. In line with previous studies^{23,24}, other factors associated with probable depression were obstetrical problems and unhappy feeling about pregnancy. The association of financial difficulty of our focus may partly be attributed to the increased amount of stress placed on a mother due to limited financial means necessary for raising an infant.^{25,26} A study in Japan by Seto and colleagues reported that chronically depressed women compared to never-depressed women were less likely to be married, had less education, had lower education, had lower income, and were more likely to use substances²⁷. Taking the evidence into consideration, government's recent parenting support addresses poverty alleviation.

Poor mental health status in women can result in poor attachment towards the child¹⁴, which was confirmed with our data showing a positive correlation between depression and bonding. There are numerous studies about postpartum depression, but not much has been reported about Japanese mothers' bonding toward the child. We found that low-bonding was associated with younger maternal age and late pregnancy registration among first-time mothers, in addition to financial difficulty mentioned above. It is likely that the first month after delivery is rather stressful and difficult to cope with especially for inexperienced first-time young mothers. This could lead to a poor attachment with the child who can be considered as the major source of the stress²⁸. As for the late pregnancy registration, it could be one of the maternal depressive symptoms, or a consequence of unintended pregnancy delaying pregnancy recognition and decision to give birth.

Despite the stress faced by first-time mothers, 90% expressed the intention to attend antenatal classes. While the data is encouraging, steps should further be taken to encourage both first-time and experienced mothers at risk of postpartum depression and low-bonding.

Our data showed that mother's intention to attend antenatal classes did not correspond with risk factors of probable depression and low bonding. The discrepancy between mothers' help seeking behavior and risk condition indicates a need for systematic screening of mothers at risk of postpartum mental disorders at the time of pregnancy registration, and recruiting them to parenting support programs at a health center. If participation to antenatal classes solely relies on women's preference, invaluable opportunity for early detection of at-risk mothers will be missed. In addition to active recruitment, improvements in both the content and the organization of these classes are needed to attract experienced mothers at risk.

Some limitations of our study must be acknowledged. "First, the data we analyzed included a relatively small number of mothers who agreed to have home visit by nurses in one city, which limits multivariate analysis of the data and generalizability of the obtained findings. Among factors that showed significance, we selected one of basic variables, mothers' age, and tried age-adjusted analyses for Tables 4 and 5. As expected, statistical significance of some items diminished including financial difficulty and gestational age for first-time mothers and obstetrical problems for experienced mothers. The financial difficulty among first-time mothers in particular, probably lost its significant due to its association with mother's age; a proportion of first-time mothers with financial difficulty was significantly higher among younger age group in our data.

Results about prevalence and associated factors of probable depression and low bonding should be read carefully. However, our primary purpose was to compare factors associated with mother's willingness to attend the antenatal classes with those of depression and bonding disorder, and the discrepancy was evident even with this small-scale study. Second, data collection procedure was not completely unified (some data were collected at the health center as mentioned above) since it was conducted for health service provision, but not for

research purpose. Third, the assessment of the bonding was done using a score only used in Japan, which limits international comparability although it is commonly used in combination with the EPDS in Japanese public service setting. Also the only indicator of support-seeking behavior used was the intention to attend antenatal classes.

In conclusion, our results underline the need for health practitioners to screen and pay closer attention to mothers with first pregnancy, obstetrical problems, financial difficulty, unhappiness about the pregnancy, younger age, and late pregnancy registration. Interventions that would specifically target these at-risk groups may help to alleviate the stress, thus decrease postpartum depression and improve mother-to-child bonding. Family and primary care physicians, public health nurses and other community health workers involved in child and maternal care should be informed and trained to detect and follow up mothers at risk of mental health problems based on early warning signs including pregnancy history, obstetrical problems, sociodemographic information and maternal feeling toward pregnancy.

ACKNOWLEDGMENT

This work was supported in part by a Grant-in-Aid for Young Scientists (A) (to AG) from the Japan Society for the Promotion of Science.

DISCLOSURE

The authors declare that they have no conflict of interest.

REFERENCES

1. Watson JP, Elliott SA, Rugg AJ, Brough DI. Psychiatric disorder in pregnancy and the first postnatal year. *Br J Psychiatry*, **144**: 453-462, 1984.
2. Ministry of Health, Labour and Welfare. "Healthy and Happy Family 21" Home page 21. Program goals toward 2014. <http://www.mhlw.go.jp/english/wp/other/councils/sukoyaka21/index.html> (Accessed on January 11, 2012)
3. Spitz R, Wolf K. Anaclitic Depression—An Inquiry into the genesis of psychiatric conditions in early childhood. *Psychoanal Stud Child*, **2**: 313-342, 1946.
4. Bowlby J. WHO Monograph Series No. 2. Maternal care and mental health. World Health Organization, Geneva, 1951.
5. Weinberg MK, Tronick ED. The impact of maternal psychiatric illness on infant development. *J Clin Psychiatry*, **59**: 53-61, 1998.
6. Barlow J, Coren E, Stewart-Brown S. Parent-training programmes for improving maternal psychosocial health. *Cochrane Database Sys Rev* 2003 : CD002020.
7. Patterson J, Mockford C, Barlow J, Pyper C, Stewart-Brown S. Need and demand for parenting programmes in general practice. *Arch Dis Child*, **87**: 468-471, 2002.
8. Smith C. Developing parenting programmes. National Children's Bureau, London, 1997.
9. Keller J, McDade K. Attitudes of low-income parents toward seeking help with parenting: implications for practice. *Child Welfare*, **79**: 285-312, 2000.
10. Matsumoto Y, Sofronoff K, Sanders MR. Socio-ecological model of parental intention to participate in Triple P-Positive parenting program. *J Child Fam Stud*, **17**: 336-352, 2009.
11. Sanders MR. Triple P-Positive Parenting Program : Towards an empirically validated multilevel parenting and family support strategy for prevention of behavior and emotional problems in children. *Clinical Child and Family Psychology Review*, **2** : 71-90, 1999.
12. Sato A, Kitamiya C, Li S, Menzawa K. Neonate home-visit guidance by public health nurses and midwives : An evaluation indexed by reduction of mother's child-care anxiety. *Jpn J Publ Health*, **52** : 328-337, 2005. [In Japanese]
13. Barnes DL. Postpartum Depression : Its impact on Couples and Marital Satisfaction. *Journal of Systemic Therapies*, **25** : 25-42, 2006.
14. Dennis C, McQueen K. The relationship between infant-feeding outcomes and postpartum depression : a qualitative systematic review. *Pediatrics*, **123** : 736-751, 2009.
15. Okano T, Murata M, Masuji F et al. Validation and reliability of Japanese version of EPDS (Edinburgh Postnatal Depression Scale). *Archives of Psychiatric Diagnostic and Clinical Evaluation*, **7** : 525-533. [In Japanese]
16. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry*, **150** : 782-786, 1987.
17. Murray L, Carothers AD. The validation of the Edinburgh Postnatal Depression Scale on a community sample. *Br J Psychiatry*, **157** : 288-290, 1990.
18. Suzumiya H, Yamashita H, Yoshida K. Depression and bonding disorder among postpartum women. *Archives of Psychiatric Diagnostics and Clinical Evaluation*, **14** : 49-57, 2003.

19. Munk-Olsen T, Laursen TM, Pedersen CB, Mors O, Mortensen PB. New parents and mental disorders : a population-based register study. *JAMA*, **296** : 2582-2589, 2006.
20. Kitamura T, Sugawara M, Sugawara K, Toda MA, Shima S. Psychosocial study of depression in early pregnancy. *Br J Psychiatry*, **168** : 732-738, 1996.
21. Mori T, Tsuchiya KJ, Matsumoto K, Suzuki K, Mori N, Takei N. HBC Study Team. Psychosocial risk factors for postpartum depression and their relation to timing of onset : the Hamamatsu Birth Cohort (HBC) Study. *J Affect Disord*, **135** : 341-346, 2011.
22. Yamashita H, Yoshida K. Screening and intervention for depressive mothers of new-born infants. *Psychiatria et Neurologia Japonica*, **105** : 1129-1135, 2003. [In Japanese]
23. Davey HL, Tough SC, Adair CE, Benziers KM. Risk factors for sub-clinical and major postpartum depression among a community cohort of Canadian Women. *Matern Child Health J*, **15** : 866-875, 2011.
24. Oppo A, Mauri M, Ramacciotti D *et al.* Risk factors for postpartum depression : the role of the Postpartum Depression Predictors Inventory-Revised (PDPI-R). Results from the Perinatal Depression-Research & Screening Unit (PNDReScU) study. *Arch Womens Ment Health*, **12** : 239-249, 2009.
25. O'Hara MW, Swain AM. Rates and risk of postpartum depression—a meta-analysis. *Int Rev Psychiatry*, **8** : 37-54, 1996.
26. Bernazzani O, Saucier JF, David H, Borgeat F. Psychosocial factors related to emotional disturbances during pregnancy. *J Psychosom Res*, **42** : 391-402, 1997.
27. Seto M, Cornelius MD, Goldschmidt L, Morimoto K, Day NL. Long-term effects of chronic depressive symptoms among low-income childrearing mothers. *Matern Child Health J*, **9** : 263-271, 2005.
28. Snellen M, Mack K, Trauer T. Schizophrenia, mental state, and mother-infant interaction : examining the relationship. *Aust N Z J Psychiatry*, **33** : 902-911, 1999.