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Relation between Mental Health Status and Psychosocial Stressors among Pregnant and Puerperium Women in Japan: From the Perspective of Working Status

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ABSTRACT

Mental health problems during pregnancy and postpartum periods are one of the alarming health issues among women in Japan. This study analyzed data on the Japanese version of the Kessler 6 (K6), specific psychosocial stressors, and working status of pregnant and puerperium women (n=1126) from respondents in the Comprehensive Survey of People's Living Conditions (CSPLC) conducted in 2007 by Ministry of Health, Labour and Welfare in Japan. Multiple logistic analyses showed the significant associations between mental health and psychosocial stressors: "family relationship," "pregnancy and birth," and "incomes/ family budgets/ debts", regardless of "employed" or "unemployed". After stratified by working status, whereas "one's job" stressor had an association with mental health only for employed females, stressors for "one's disease/long -term care" and "housework" had associations only for unemployed ones. For employed women, the primary factor for mental health was "family relationship" stressor. Although mental health status measured by K6 was not different between employed or unemployed female population, primary stressors related mental health was revealed to differ with working status. Especially, "family relationship" stressor was the highest risk factor of mental health in employed women. More importantly, the results provided evidence on the differences in associations between mental health and specific psychosocial stressors by working status. Psychosocial risk assessments and interventions on working status among pregnant and puerperium women should be imperative to pay attention for social politics.

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1. INTRODUCTION

Women are vulnerable to mood instability during reproductive transition [1]. Postpartum depression was also described as "a major public health problem" [2] because depression often leads comorbid anxiety disorders [3] and suicide intent in general population. Although meta analyses of 21 studies in high-income countries have reported that the mean rate of depression was 12% among pregnant women, it may vary greatly according to countries and mode of assessment [4]. Many studies have indicated that mental disorders

(e.g. depression, anxiety, panic, suicidal ideation) and depressive or anxiety symptoms during pregnancy has impacts on postpartum depression [5],[6],[7],[8],[9],[10].

According to Meta analyses [6],[11] and previous studies reporting risk factors for mental health in both pregnant and postpartum women, the main factors are summarized as follows: past psychiatric history [7],[9],[12],[13], relationship with partner [8] , social support [6],[9],[12],[13],[14], sociodemographic factors ; e.g. age [15],[16], income [6],[14],[17],[18], working status [17],[19],[20], and psychosocial stressors [6],[8],[12],[21],[22],[23],[24],[25]. Furthermore, O'Hara and Swain [17] have found that both global and specific stressors are the major predictors for depression during pregnant and postpartum periods. Thus the American College of Obstericians & Gynecologists (ACOG) has advocated that screening all women for psychosocial stress and other psychosocial issues each trimester of pregnancy and postpartum period in 2006 committee opinion [26].

Like most developed countries [27],[28] the impact of working status in pregnancy and postpartum periods might not be ignorable for a large number of women, because of an increasing proportion of women who work even during pregnancy period and return to work in postpartum [29] in Japan. On the other hand, fewer studies focused on the relation between women's mental health and working status during pregnancy and postpartum period [30]. Some studies found correlations [17],[19],[20] while other did not [8],[31],[32]. Therefore, previous empirical results do seem to be inconclusive. Furthermore, there has no studies on the relation between specific psychosocial stressors associated with pregnant and postpartum mental health and working status. Hence, the main objectives of this study are to identify differences in mental health status and the associations between mental health and specific psychosocial stressors by working status among pregnant and puerperium women, using nationally representative data in Japan.

2. METHODS

2.1. Study population

This study used data from the Comprehensive Survey of People's Living Conditions (CSPLC) in 2007 conducted by Ministry of Health, Labour and Welfare (MHLW) in Japan. The CSPLC was designed to obtain prime data required to the planning and management for the health, labour and welfare policies administrated by MHLW. This survey covered approximately 760,000 individuals living in about 290,000 households in Japan. The participants were randomly chosen in 5,440 districts from the Census held in 2005.

The survey was composed of five questionnaires. This study uses data on two baseline questionnaires for household and health. Each respondent distributed by an enumerator in advance by mail filled out these questionnaires individually and the enumerator visited each participant's house to distribute and collect them within a couple of days. Based on the health questionnaire, we identified 1154 respondents who answered that they went to hospital due to pregnancy and puerperium (including diseases such as imminent abortion and placenta previa) in the question item for ambulatory. Out of these, 28 were excluded due to the missing observations on variables indispensable for this study, such as mental health status (K6) or psychosocial stressors. After all, this study selected 1126 women and no statistical differences were observed regarding average age and working status between effective and non-effective respondents.

The study population (n=1126) was estimated to represent 0.37% of the entire women surveyed by CSPLC. Since the Vital Statistics in 2007 [33] showed that women who gave birth accounted for approximately 1.7% of the Japanese female population, the respondents represented approximately 22% (0.37/1.7) of the total number of pregnant and parturient women surveyed. Additionally, the Patient Survey known as another nationally representative survey conducted by MHLW in 2008 [34]revealed that only 0.026% of women admitted to hospitals because of injury and disease relevant to pregnancy, parturition, and puerperia, which are estimated to be about 1.5% (0.026/1.7) of the total number of pregnant and puerperium women in Japan. If all of these hospitalized women due to injury and diseases relevant to pregnancy, parturition, and puerperia responded to the CSPLC, they would represent about 7% (1.5/22) of the study population. Hence, it would appear that many of respondents utilized the hospitals for normal prenatal or postnatal care. This study was approved by the Ethics Committee of University of Tsukuba, Ibaraki, Japan.

2.2. Measurements

(1) Mental health

Mental health was assessed by the Japanese version [35] of the Kessler 6 (K6). K6, as a screening scale for psychological distress, is a powerful measurement to discriminate between community cases and non-cases of DSM-IV/SCID disorders, and it was applied in national surveys in several developed countries, and WHO World mental health survey [35], [36], [37]. The respondents answered six items rated on 5-point Likert scale. A higher total score corresponds to a worse mental health condition. Responses on the 5-point likert scale transformed to scores ranging from 0 to 4 points, and the total scores were calculated by

complementing missing values with the average on each item. All respondents were combined into two groups, "below 5 points" or "5 points or above," with reference to 5 points identified as the optimal cut-off point for screening mood and anxiety disorders in Japan [38]. The screening performance for this index has been confirmed in Japanese population [35] and Cronbach's α coefficient for this index in the present study was 0.87.

(2) Psychosocial stressors

The CSPLC determines the types of stressors among individuals experiencing distress in life. The CSPLC asks "Do you have worries or stress?" to the respondents. Then, only for respondents who answered "Yes" to this question were asked "Causes of stress or worries" which include 19 items by multiple choice settings. Therefore, for the analyses the "No" group in each item for "Causes of stress or worries" included respondents who answered "No" to the question item "Do you have worries or stress?".

(3) Sociodemographics

Sociodemographic variables included age (calculated on the basis of year and month of birth) and working status. The median was used as a yardstick for age. Working status was grouped into 'employed (including a childcare/family-care leave and any activities involving income)' or 'unemployed.'

(4) Statistical Analysis

The association between K6 and specific psychosocial stressors for each working status ('employed' and 'unemployed') was analyzed in the following manner. At first, the association between K6 and each of the potential risk factors was assessed using univariate logistic regression analysis. Next, a forward multiple regression analysis was applied to all the factors found to be related to the outcome at the $p<.05$ level in the univariate logistic regression analysis. Lastly, adjusted ORs with 95% confidence limits were computed and statistical significance was defined as $p<0.05$. All of the statistical analyses were performed using SPSS 17.0 Japanese version.

3. RESULTS AND DISCUSSIONS

3.1. Results

Descriptive statistics of sociodemographic characteristics and psychosocial stressors of the study sample were shown Table 1. The average age of the 1126 valid respondents was 31.1 (SD =4.7) years old. The number of 'employed' was 521 women (46.3%), and of 'unemployed' was 605 women (53.7%) . In descending order of frequency, psychosocial stressors were included the following: "pregnancy and birth" 609 women (54.1%), "incomes/ family budgets/ debts" 244 women (21.7%), "childcare" 236 women (21.0%), "one's job" 162 women (14.4%), and "housework" 130 women (11.5%). For K6, the high scoring group (5 points or above on K6) consisted of 383 women (33.1%) whereas the low scoring group (below 5 points on K6) comprised 753 women (66.9%).

There were no statistically significant differences in average age and percentage of high scoring group of K6 between 'employed' women and 'unemployed' women: 31.3 (SD4.6) for 'employed' versus 30.8 (SD4.8) for 'unemployed' ($p=.076$) and for 5 points or above on K6, 34.0% for 'employed' versus 32.4% for 'unemployed' ($p=0.61$).

The univariate logistic regression analysis revealed risk factors associated with K6 as follows: for the 'employed' group, family relationship, relationship with others, marriage, motivation in life, no free time, incomes/ family budgets/ debts, one's disease/long term care, disease/long-term care of other family members, pregnancy and birth, childcare, housework, education of children, one's job, and job of other family members (Table 2) : and for the 'unemployed' group, family relationship, relationship with others, marriage, motivation in life, no free time, incomes/ family budgets/ debts, one's disease/long -term care, pregnancy and birth, childcare, housework, education of children, one's job, job of other family members, and housing /living environments (including pollution, safety, and transportation conditions) (Table 3).

Table 1. Sociodemographic and psychosocial characteristics

Sociodemographic		
Age (year) (mean ± SD)	31.1 ± 4.7	
Job status		
Employment	521	(46.3%)
Unemployment	605	(53.7%)
Psychosocial stressor		
Family relationship		
Stressful	110	(9.8%)
No stress	1016	(90.2%)
Relationship with others		
Stressful	54	(4.8%)
No stress	1072	(95.2%)
Love/sex		
Stressful	8	(0.7%)
No stress	1118	(99.3%)
Marriage		
Stressful	22	(2.0%)
No stress	1104	(98.0%)
Divorce		
Stressful	3	(0.3%)
No stress	1123	(99.7%)
Bullying/ sexual harassment		
Stressful	3	(0.3%)
No stress	1123	(99.7%)
Motivation in life		
Stressful	18	(1.6%)
No stress	1108	(98.4%)
No free time		
Stressful	89	(7.9%)
No stress	1037	(92.1%)
Incomes/ family budgets/ debts		
Stressful	244	(21.7%)
No stress	882	(78.3%)
One's disease/long -term care		
Stressful	36	(3.2%)
No stress	1090	(96.8%)
Disease/long-term care of other family members		
Stressful	26	(2.3%)
No stress	1100	(97.7%)
Pregnancy and birth		
Stressful	609	(54.1%)
No stress	517	(45.9%)
Childcare		
Stressful	236	(21.0%)
No stress	890	(79.0%)
Housework		
Stressful	130	(11.5%)
No stress	996	(88.5%)
One's academics		
Stressful	6	(0.5%)
No stress	1120	(99.5%)
Education of children		
Stressful	96	(8.5%)
No stress	1030	(91.5%)
One's job		
Stressful	162	(14.4%)
No stress	964	(85.6%)
Job of other family members		
Stressful	61	(5.4%)
No stress	1065	(94.6%)
Housing /living environment (including pollution, safety, and transportation conditions)		
Stressful	76	(6.7%)
No stress	1050	(93.3%)

Note.
1) n=1126

Tabel2. Associations between status of mental health and psychosocial stressors and socio-demographic characreristics for 'employed'women

	Total (n=521)		Low K6 scoring group (n=344)		High K6 scoring group (n=177)		OR	95% CI	p-value
Age									
31 or younger	244	(46.8%)	164	(47.7%)	80	(45.2%)	1.11	0.77-1.59	.592
32 and older	277	(53.2%)	180	(52.3%)	97	(54.8%)	1.00		
Family relationship									
Stressful	45	(8.6%)	10	(2.9%)	35	(19.8%)	8.23	3.97-17.08	<.001
No stress	476	(91.4%)	334	(97.1%)	142	(80.2%)	1.00		
Relationship with others									
Stressful	26	(5.0%)	10	(2.9%)	16	(9.0%)	3.32	1.47-7.48	.004
No stress	495	(95.0%)	334	(97.1%)	161	(91.0%)	1.00		
Love/sex									
Stressful	4	(0.8%)	0	(0.0%)	4	(2.3%)	3.21^{-9}	0.00	.999
No stress	517	(99.2%)	344	(100.0%)	173	(97.7%)	1.00		
Marriage									
Stressful	12	(2.3%)	4	(1.2%)	8	(4.5%)	4.02	1.20-13.55	.025
No stress	509	(97.7%)	340	(98.8%)	169	(95.5%)	1.00		
Divorce									
Stressful	2	(0.4%)	1	(0.3%)	1	(0.6%)	3.39^{-9}	0.00	1.000
No stress	519	(99.6%)	343	(99.7%)	176	(99.4%)	1.00		
Bullying/ sexual harassment									
Stressful	3	(0.6%)	0	(0.0%)	3	(1.7%)	3.19^{-9}	0.00	.999
No stress	518	(99.4%)	344	(100.0%)	174	(98.3%)	1.00		
Motivation in life									
Stressful	8	(1.5%)	1	(0.3%)	7	(4.0%)	14.12	1.72-115.72	.014
No stress	513	(98.5%)	343	(99.7%)	170	(96.0%)	1.00		
No free time									
Stressful	33	(6.3%)	13	(3.8%)	20	(11.3%)	3.24	1.57-6.69	.001
No stress	488	(93.7%)	331	(96.2%)	157	(88.7%)	1.00		
Incomes/ family budgets/ debts									
Stressful	113	(21.7%)	43	(12.5%)	70	(39.5%)	4.58	2.95-7.11	<.001
No stress	408	(78.3%)	301	(87.5%)	107	(60.5%)	1.00		
One's disease/long-term care									
Stressful	13	(2.5%)	3	(0.9%)	10	(5.6%)	6.81	1.85-25.06	.004
No stress	508	(97.5%)	341	(99.1%)	167	(94.4%)	1.00		
Disease/long-term care of other family members									
Stressful	11	(2.1%)	4	(1.2%)	7	(4.0%)	3.50	1.01-12.12	.048
No stress	510	(97.9%)	340	(98.8%)	170	(96.0%)	1.00		
Pregnancy and birth									
Stressful	280	(53.7%)	146	(42.4%)	134	(75.7%)	4.23	2.82-6.33	<.001
No stress	241	(46.3%)	198	(57.6%)	43	(24.3%)	1.00		
Childcare									
Stressful	71	(13.6%)	36	(10.5%)	35	(19.8%)	2.11	1.27-3.50	.004
No stress	450	(86.4%)	308	(89.5%)	142	(80.2%)	1.00		
Housework									
Stressful	59	(11.3%)	22	(6.4%)	37	(20.9%)	3.87	2.20-6.80	<.001
No stress	462	(88.7%)	322	(93.6%)	140	(79.1%)	1.00		
One's academics									
Stressful	2	(0.4%)	0	(0.0%)	2	(1.1%)	3.18^{-9}	0.00	.999
No stress	519	(99.6%)	344	(100.0%)	175	(98.9%)	1.00		
Education of children									
Stressful	33	(6.3%)	12	(3.5%)	21	(11.9%)	3.72	1.79-7.76	<.001
No stress	488	(93.7%)	332	(96.5%)	156	(88.1%)	1.00		
One's job									
Stressful	135	(25.9%)	65	(18.9%)	70	(39.5%)	2.81	1.87-4.21	<.001
No stress	386	(74.1%)	279	(81.1%)	107	(60.5%)	1.00		
Job of other family members									
Stressful	33	(6.3%)	12	(3.5%)	21	(11.9%)	3.72	1.79-7.76	.001
No stress	488	(93.7%)	332	(96.5%)	156	(88.1%)	1.00		
Housing /living environment (including pollution, safety, and transportation conditions)									
Stressful	28	(5.4%)	15	(4.4%)	13	(7.3%)	1.74	0.81-3.74	.157
No stress	493	(94.6%)	329	(95.6%)	164	(92.7%)			

Note.
1) The low K6 scoring group includes subjects who scored below five, and the high K6 scoring group includes subjects who scored five or above.

Tabel3. Associations between status of mental health and psychosocial stressors and socio-demographic characreristics for 'unemployed'women

	Total (n=605)		Low K6 scoring group (n=409)		High K6 scoring group (n=196)		OR	95% CI	p-value
Age									
31 or younger	284	(46.9%)	192	(46.9%)	92	(46.9%)	1.00	0.71-1.41	.999
32 and older	321	(53.1%)	217	(53.1%)	104	(53.1%)	1.00		
Family relationship									
Stressful	65	(10.7%)	20	(4.9%)	45	(23.0%)	5.80	3.31-10.14	<.001
No stress	540	(89.3%)	389	(95.1%)	151	(77.0%)	1.00		
Relationship with others									
Stressful	28	(4.6%)	9	(2.2%)	19	(9.7%)	4.77	2.12-10.75	<.001
No stress	577	(95.4%)	400	(97.8%)	177	(90.3%)	1.00		
Love/sex									
Stressful	4	(0.7%)	1	(0.2%)	3	(1.5%)	6.34	0.66-61.36	.111
No stress	601	(99.3%)	408	(99.8%)	193	(98.5%)	1.00		
Marriage									
Stressful	10	(1.7%)	2	(0.5%)	8	(4.1%)	8.66	1.82-41.17	.007
No stress	595	(98.3%)	407	(99.5%)	188	(95.9%)	1.00		
Divorce									
Stressful	1	(0.2%)	0	(0.0%)	1	(0.5%)	3.39^{-9}	0.00	1.000
No stress	604	(99.8%)	409	(100.0%)	195	(99.5%)	1.00		
Bullying/ sexual harassment									
Stressful	0	(0.0%)	0	(0.0%)	0	(0.0%)			
No stress	605	(100.0%)	409	(100.0%)	196	(100.0%)			
Motivation in life									
Stressful	10	(1.7%)	1	(0.2%)	9	(4.6%)	19.64	2.47-156.12	.005
No stress	595	(98.3%)	408	(99.8%)	187	(95.4%)	1.00		
No free time									
Stressful	56	(9.3%)	24	(5.9%)	32	(16.3%)	3.13	1.79-5.48	<.001
No stress	549	(90.7%)	385	(94.1%)	164	(83.7%)	1.00		
Incomes/ family budgets/ debts									
Stressful	131	(21.7%)	59	(14.4%)	72	(36.7%)	3.45	2.31-5.14	<.001
No stress	474	(78.3%)	350	(85.6%)	124	(63.3%)	1.00		
One's disease/long-term care									
Stressful	23	(3.8%)	6	(1.5%)	17	(8.7%)	6.38	2.47-16.45	<.001
No stress	582	(96.2%)	403	(98.5%)	179	(91.3%)	1.00		
Disease/long-term care of other family members									
Stressful	15	(2.5%)	7	(1.7%)	8	(4.1%)	2.44	0.87-6.84	.089
No stress	590	(97.5%)	402	(98.3%)	188	(95.9%)	1.00		
Pregnancy and birth									
Stressful	329	(54.4%)	175	(42.8%)	154	(78.6%)	4.90	3.31-7.27	<.001
No stress	276	(45.6%)	234	(57.2%)	42	(21.4%)	1.00		
Childcare									
Stressful	165	(27.3%)	78	(19.1%)	87	(44.4%)	3.39	2.33-4.93	<.001
No stress	440	(72.7%)	331	(80.9%)	109	(55.6%)	1.00		
Housework									
Stressful	71	(11.7%)	22	(5.4%)	49	(25.0%)	5.86	3.43-10.04	<.001
No stress	534	(88.3%)	387	(94.6%)	147	(75.0%)	1.00		
One's academics									
Stressful	4	(0.7%)	1	(0.2%)	3	(1.5%)	6.34	0.66-61.36	.111
No stress	601	(99.3%)	408	(99.8%)	193	(98.5%)	1.00		
Education of children									
Stressful	63	(10.4%)	24	(5.9%)	39	(19.9%)	3.99	2.32-6.85	<.001
No stress	542	(89.6%)	385	(94.1%)	157	(80.1%)	1.00		
One's job									
Stressful	27	(4.5%)	10	(2.4%)	17	(8.7%)	3.79	1.70-8.44	.001
No stress	578	(95.5%)	399	(97.6%)	179	(91.3%)	1.00		
Job of other family members									
Stressful	28	(4.6%)	11	(2.7%)	17	(8.7%)	3.44	1.58-7.49	.002
No stress	577	(95.4%)	398	(97.3%)	179	(91.3%)	1.00		
Housing /living environment (including pollution, safety, and transportation conditions)									
Stressful	48	(7.9%)	23	(5.6%)	25	(12.8%)	2.45	1.35-4.45	.003
No stress	557	(92.1%)	386	(94.4%)	171	(87.2%)	1.00		

Note.
1) The low K6 scoring group includes subjects who scored below five, and the high K6 scoring group includes subjects who scored five or above.

Furthermore, as results of multiple logistic regression analysis (likelihood ratio step-up method) applying above risk factors as explanatory variables, following psychosocial stressors were significantly related to K6 : for the 'employed' group, family relationship (OR=5.7, 95%CI=2.6-12.5), incomes/ family budgets/ debts (OR=2.7, 95%CI=1.6-4.3), pregnancy and birth (OR=3.2, 95%CI=2.0-4.9), and one's job (OR=2.2, 95%CI=1.4-3.4) (Table 4) : and for the 'unemployed' group, family relationship (OR=3.1, 95%CI=1.6-5.7), incomes/ family budgets/ debts (OR=1.6, 95%CI=1.0-2.6), one's disease/long-term care (OR=3.4, 95%CI=1.2-9.6), pregnancy and birth (OR=3.3, 95%CI=2.1-5.0), childcare (OR=1.6, 95%CI=1.0-2.5), and housework (OR=2.3, 95%CI=1.2-4.2) (Table 5).

Table4. Adjusted odds ratio of mental health for 'employed' women

	Adjusted OR	95% CI	p-value
Family relationship			
Stressful	5.7	2.6-12.5	<.001
No stress	1.0		
Incomes/ family budgets/ debts			
Stressful	2.7	1.6-4.3	<.001
No stress	1.0		
Pregnancy and birth			
Stressful	3.2	2.1-4.9	<.001
No stress	1.0		
One's job			
Stressful	2.2	1.4-3.4	.001
No stress	1.0		

Note.
1) n=521

Table5. Adjusted odds ratio of mental health for 'unemployed' women

	Adjusted OR	95% CI	p-value
Family relationship			
Stressful	3.1	1.7-5.7	<.001
No stress	1.0		
Incomes/ family budgets/ debts			
Stressful	1.7	1.0-2.6	.032
No stress	1.0		
One's disease/long-term care			
Stressful	3.4	1.2-9.6	.021
No stress	1.0		
Pregnancy and birth			
Stressful	3.3	2.1-5.0	<.001
No stress	1.0		
Childcare			
Stressful	1.6	1.0-2.5	.039
No stress	1.0		
Housework			
Stressful	2.3	1.2-4.2	.009
No stress	1.0		

Note.
1) n=605

Regardless of working status, three psychosocial stressors, family relationships, pregnancy and birth, and incomes/ family budgets/ debts, were significantly associated with K6. After stratified by working status, whereas one's job became significantly related to K6 only for the 'employed' group, one's disease/long-term care, housework, and childcare turned to have significant relations to K6 only for the 'unemployed' group. Besides, family relationship would have the strongest association with K6 for the 'employed' group.

3.2. Discussions

Difference in mental health status related to working status

The average age 31.1 of the study population mostly corresponds to the average age 30.7 of Japanese women who gave birth in 2007. The high scoring group (5 points or above on K6) composed 347 women (33.1%). The previous study reported that 32.6% of women ranging in age from 25 to 34 in Japanese population [39], almost the same age as our respondents, scored 5 points or above on K6, which is consistent with the results in this study. This suggests that percentage of pregnant / puerperium women having psychological problems may not differ from the average of entire female population in the same age group in Japan. Therefore, further research is needed to investigate the mental health status of female population not with or without pregnancy / puerperium.

In this study, working status had no association with K6 status, which is consistent with some previous studies in Japan [31] and other countries [8], [32]. Conversely, there has been an association between working status and mental health in other previous studies, which have reported that unemployment was a risk factor for mental health in Japan [19] and other countries [17], [20]. In these literatures, it has been suggested that unemployment during pregnancy and postpartum periods provided women low rate of parental allowance, which might cause a stressful economic situation [20], and disadvantage for benefits by being apart from social network. However, since the association between working status and mental health remains still uncertain, further research is needed to investigate this topic.

Difference in mental health related psychosocial stressors by working status

From the result of a multiple logistic regression analysis with controlling other variables, regardless of working status, three psychosocial stressors, family relationship, pregnancy and birth, and incomes/ family budgets/ debts, were significantly associated with maternal mental health. The study thus suggests that these causes represent common psychosocial stressors related mental health among pregnant and puerperium women in Japan.

This finding was consistent with previous studies as follows. First, the association between partner relationship [8] , life events such as marriage [32] and pregnancy [8], [11], and depression had been reported. Second, according to the meta analyses, socioeconomic status was new predictors of postpartum depression [24]. Socioeconomic advantage confers many psychosocial benefits including higher quality of health insurance which promote maternal well-being [38]. Furthermore, other studies have reported that lower family income [6], [14], [17], [26] might have become a risk factor in the development of pregnant and postnatal depression. This helps to sketch out a beginning demographic profile of vulnerable women with low household incomes and suggests that women at risk for mental health problems during pregnancy and postpartum might experience financial stressors [26]. A previous study has discussed that pregnant women in unskilled and low-waged occupations were more likely to experience greater work related psychological distress than those who maintain advantaged socioeconomic status [41]. However, in this study, socioeconomic status such as family income was not examined. Therefore, further studies exploring the association between family income and mental health in pregnant and parturient women are needed in Japan. Conversely, the study demonstrated that specific stressors of pregnant and parturient women would depend upon their working status.

As regards employed women, family relationship (odds ratio 5.7) were the strongest risk factor and their job (odds ratio 2.2) was distinctive towards mental health. First, regarding family relationship stressors, previous studies had provided evidences such that employment conditions are highly salient to maternal psychological outcomes [30]. Family friendliness, occupational conditions and environments at worksite that help employees' work and life balance had influenced mental health of employees [10], [41]. It had been reported that adverse employment conditions and poor circumstances at worksites during pregnancy period, including a lack of access to paid and unpaid parental leave entitlements, had been risk factors for worse psychological distress during pregnancy [41] and postpartum periods [42]. Second, regarding ones' job stressors, it had been reported that women had the more career-oriented life style and more mothers were compelled to return to work after giving birth due to the unfavorable socioeconomic circumstances in western European countries [43], and early intention to return work soon after delivery had an association with postpartum depression [43]. In Japan, similarly, childbearing occurs in the context of employment participation, therefore the impact of employment during pregnancy and postpartum periods could be relevant to a large number of women.

Whereas, regarding unemployed women, high risk stressors composed of their diseases or long-term care and childcare as well as housework. Women had been expected to be submissive to other family members traditionally in Japan so that they, especially unemployed women, have had a role to take good care of the household and the family. The recent gender role between a married couple over housework may be changed, but the stereotyped social norm toward women still exists and women, especially unemployed

housewives, may feel pressured to be in charge of the entire housework. The findings in this study suggested that stressors for these roles were significant risk factors for mental health among unemployed pregnant and puerperium women.

Consequently, the study highlights the importance of reducing the three psychosocial stressors; (1) family relationship, (2) pregnancy and birth, and (3) incomes/ family budgets/ debts and the significance of developing coping with these three stressors among pregnant and puerperium women. Furthermore, because relevant factors affecting mental health depend upon working status, reducing and coping with each stressor need to be examined. For example, the essential support to develop coping strategies it is employed women require psychosocial supports in order to develop coping strategies toward stressors related to family relationship and their occupation, and it is essential for unemployed women to receive psychosocial supports for alleviating stressors related to their own diseases, long-term care, childcare, and housework.

Compared with the general population of parturients, the study population potentially included slightly higher ratios of women suffering from injury and disease relevant to pregnancy and puerperia. However, this is the first study to evaluate the relationship between working status and mental health, as well as specific psychosocial stressors and risk assessments by working status during pregnancy and puerperium periods, using a national representative samples in Japan. In order for considering social policies to support mental health among pregnant and parturient women, it should be imperative to pay attention to stressors for family relationships, pregnancy and birth, and incomes/ family budgets/ debts, and stressors related to working status.

There are several limitations to this study. First, the observed associations between mental health and psychosocial stressors are based on cross-sectional data and we cannot infer causal directions. Longitudinal investigations are needed to describe these relationships further. Second, since the variables analyzed in this study were limited on a part of household and health questionnaires of the CSPLC, we could not apply impacts of other psychosocial stressors and sociodemographics variables, such as income and education, in this study. Third, the CSPLC questions and response categories are not detailed enough to obtain a reliable measures, therefore the national information infrastructure need to be improved to gather valid and reliable data for psychosocial stressors and sociodemographics. Finally, the study population from data on CSPLC potentially included slightly higher ratios of women suffering from injury and disease relevant to pregnancy and puerperia than the general population of parturients. Since there has been no nationally representative data on gravida, the survey are required for further studies in Japan.

4. CONCLUSIONS

Although women working during pregnancy and postpartum periods have been increasing, less is known about the linkage between mental health and psychosocial stressors in terms of working status. Extracting pregnant and parturient women from nationally represented data, this study identified differences in mental health status by working status and evaluated a correlation between their mental health and psychosocial stressors. Those who scored five or higher in K6 accounted for 33.2% of 1126 valid respondents and mental health had no association with working status. Mental health was related to stressors including family relationships, pregnancy and birth, and incomes/ family budgets/ debts regardless of working status. Whereas one's job stressor associated with mental health only for employed females, stressors for one's disease/long-term care and housework had associations only for unemployed ones. As regards employed women, the primary risk factor for mental health was family relationship stressor. It is thus considered important to explore stressors reduction and stress coping based upon working status when examining mental health in pregnant and parturient women.

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