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(Citation)
Women's Health,21:1-10

(Issue Date)
2025-06

(Resource Type)
journal article

(Version)
Version of Record

Research article

WOMEN'S HEALTH

Women's Health
Volume 21: 1–10

DOI: 10.1177/17455057251347082
journals.sagepub.com/home/whe
Sage

Factors associated with health-related quality of life and physical health of women raising infants and toddlers in Japan

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Abstract

Background: Policies to support postpartum and child-rearing periods for women have been strengthened in Japan in recent years to combat the declining birth rate. However, the type of support required to improve the quality of life and health of these women remains unclear because of the insufficient research on new policies.

Objectives: This study aimed to examine the self-reported health status of Japanese women raising infants and toddlers aged 3 months to 3 years and determine the factors associated with health-related quality of life and physical health.

Designs: A cross-sectional observational study was conducted using self-administered questionnaires between March and November 2021.

Methods: Two hundred and fifty-nine Japanese mothers (164 or 68.8% being first-time mothers) participated in a survey using self-administered questionnaires that included the Somatic Symptom Scale-8, 36-Item Short-Form Health Survey, and Health-Promoting Lifestyle Profile II.

Results: The physical component summary scores of the participants were 49.2, 51.5, and 47.9 for those in their 20s, 30s, and 40s, respectively, all of which were below Japanese population norms in each age group. Employment ($\beta = -1.57$, $p = 0.01$), stress-coping skills ($\beta = -0.50$, $p < 0.01$), and optimistic thinking ($\beta = -1.18$, $p < 0.01$) were associated with fewer physical symptoms. Not being a first-time mother ($\beta = 2.85$, $p = 0.01$) and use of maternity-home services ($\beta = 6.59$, $p = 0.02$) were positively associated with the physical health. Moreover, the use of consultations or parenting classes provided by the local government ($\beta = 3.36$, $p = 0.02$), coping with stress ($\beta = 0.81$, $p < 0.01$), and optimistic thinking ($\beta = 3.46$, $p < 0.01$) were positively associated with the mental component summary score. Age of the youngest child ($\geq$1 year; $\beta = 3.30$, $p = 0.03$) and optimistic thinking ($\beta = 1.60$, $p < 0.01$) were positively associated with the role/social component summary.

Conclusions: The physical quality of life of Japanese mothers raising children has declined to a level that cannot be improved through general self-care practices. Therefore, improving the content of health education is necessary, with a particular focus on the physical health of women raising children. The policy of child-rearing support, which is strengthening in Japan, such as childcare consultation, has a positive impact on the mental health of women during child-rearing.

Keywords

birth rate, child rearing, physical health, quality of life

Date received: 25 July 2024; revised: 12 April 2025; accepted: 7 May 2025

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Introduction

The conceptual model of motherhood called the "spillover model" explains that mothers can love their children only when they receive adequate support and care and are physically and mentally healthy.[1] Positive perceptions of mothers regarding their own health exhibit a positive impact on their parenting behavior, promoting the health and appropriate development of their children.[2,3] Physical discomfort in the postpartum period lasts for 1 year and impacts mental health (MH) in the long term.[4,5] Therefore, improving the health status and quality of life (QoL) of child-rearing women from both physical and MH aspects is important for both women and children. Although many studies have focused on the health-related QoL (HRQoL) of mothers with ill or disabled children,[6–11] few have focused on the HRQoL of child-rearing mothers in general, including those with healthy children.[12]

In the context of rapidly falling birth rates, an aging population, and the shift to nuclear families, Japanese mothers raising children tend to feel that they do not have enough time for themselves, and raising children without help from others is difficult in a nuclear family society.[13] In addition, Japanese mothers raising children younger than 3 years tend to disregard their own health and delay seeing a doctor when they notice symptoms of physical or MH issues.[14] Therefore, in recent years, continuous care for women during their child-rearing years has become an important policy issue. The Japanese government established the Children and Families Agency in 2023 as an external organ of the Cabinet Office, responsible for administering efforts to enhance the welfare and improve the health of children and their families. In addition, following the revision of the Maternal and Child Health Act (2019), the implementation of "postpartum care services" has become a mandatory effort for cities, towns, and villages since 2021. It is a project for municipalities to provide mental and physical care and childcare support to mothers and children within 1 year of childbirth. For example, providing postpartum care services after childbirth through overnight stays, day visits in facilities, or home visits with public expense assistance were introduced to support mothers who feel uneasy and have concerns about child-rearing.[15] It is provided to all those who wish to receive it, although fees and care may vary depending on the area.

A previous study reported an association of the total QoL with emotional support from families and sufficient sleep among Japanese mothers with 4-month-old infants.[16] Furthermore, the QoL of Japanese mothers with 18-month-old infants was associated with emotional support from families and using child-rearing support facilities.[16] Particularly, lifestyle habits, such as getting enough sleep, enhance QoL among mothers caring for children younger than 1 year.

Previous studies conducted outside Japan have also reported that social support enhances women's HRQoL during parenting. Emmanuel et al. reported social support as a statistically significant positive predictor of the mental domain of HRQoL in Australian women at 36 weeks of pregnancy and at 6 and 12 weeks following childbirth. Social support was a significant predictor of HRQoL in the physical domain, specifically 12 weeks after childbirth.[17] The positive impact of social support on the physical aspects of women's QoL around 12 weeks postpartum may be attributed to the period of physical recovery and various transitions in family functions and roles. The Maternal Social Support Scale, which mainly consists of family support, friendship networks, and help from spouse/partner, has been used to measure social support previously. However, the use of child-rearing support from public services has rarely been measured as a predictor of improved HRQoL among women raising their children after childbirth.

A review of studies of women in the general population during the child-rearing period up to 2 years postpartum showed that they experience a range of physical conditions, including fatigue/physical exhaustion, sleep-related problems, pain, sexual problems, hemorrhoids/constipation, and breast problems.[18] For women raising children, psychological, social, and physical aspects are important determinants for QoL. However, few studies have identified the extent of women's physical symptoms and factors that generally improve their physical QoL during childcare. Additionally, knowledge about child-rearing women's self-care abilities is limited. Alternatively, whether child-rearing women engage in a lifestyle that leads to health-promoting behaviors remains unclear. Therefore, we hypothesized that women who lead healthier lifestyles and use the child-rearing support system from public services would quantitatively have a higher physical, mental, and social health status.

This study aimed to explore the physical, psychosocial, and social components of physical symptoms and HRQoL among Japanese women raising infants and identify the factors influencing them.

Methods

Study design

This observational study was conducted using self-administered questionnaires.

Setting and participants

As organizations to engage with women raising children, we selected three types of facilities—nursery schools, childcare support centers, and midwife-led maternity homes in Nagasaki City—based on snowball sampling and

recruited women rearing infants and toddlers aged 3 months to 3 years. Women who had recovered to some extent from the physical changes of the postnatal period and had established a rhythm of life with their children between the ages of 3 months and 3 years, which is the focus of comprehensive support centers for child-rearing generations in Japan, were included in the study. Nagasaki City is a local government in western Japan, with a population of 400,000. The inclusion criteria was women rearing infants and toddlers aged 3 months to 3 years in Nagasaki city. Women who could not read the Japanese questionnaire were excluded. The initial sample size was determined to be 200, based on an effect size of 0.4, a statistical power of 0.8, and a two-sided significance level of 0.05. Considering that the response rate was estimated at ~67%, the sample size was subsequently adjusted to 300.

Data collection methods

Consent was first obtained from facility managers and then from all the women. We visited nine facilities—four nursery schools, four childcare centers, and one maternity home—distributing the questionnaires to 324 mothers between March and November 2021. For the convenience of the staff in each facility, the questionnaire was collected by the researchers in a collection box later or on-site. An information sheet was attached to the questionnaire. A check box seeking consent from mothers was presented on the first page of the questionnaire.

Contents of the survey

The questionnaire consisted of basic items (age, working status, number of preschool children, age of youngest children, children attending preschool or kindergarten, persons who support them, and use of childcare support), questions regarding health awareness and healthy lifestyle, and self-reported health using the Somatic Symptom Scale-8 (SSS-8) and the 36-Item Short-Form Health Survey (SF-36) to assess physical and MH status. The questionnaires used in this study were pilot-tested.

Physical health status. The SSS-8 is a shortened version of the Patient Health Questionnaire-15 (PHQ-15), which is used worldwide as a physical symptom scale.[19,20] It was developed by German researchers and has been confirmed as highly reliable and valid in Germany. The PHQ-15 is an excellent tool for assessing general somatic symptoms in large-scale studies, but it also includes items for menstrual disorders, sexual problems, and syncope, which have low prevalence rates. The SSS-8 consists of eight questions on gastrointestinal problems; back pain; arm, leg, or joint pain; headache; chest pain; shortness of breath; dizziness; tiredness or lack of energy; and trouble sleeping. Each question is answered on a five-point scale from "not at all (0 points)" to "very much (4 points)." The lower the score, the better the health status. The SSS-8 has excellent item characteristics and good reliability (Cronbach $\alpha = 0.81$).[20]

Physical and MH status. The SF-36 is an HRQoL scale developed to survey health status, including that of the general population.[21,22] It is widely used internationally and is recognized for its reliability and validity.[23] The questionnaire consists of 36 items and 8 scales: physical function (PF), daily role functioning (physical) (RP), physical pain (BP), overall sense of health (GH), vitality (VT), social functioning (SF), daily role functioning (mental) (RE), and MH. In this study, a three-component summary score was used, which has been validated in Asian cultures for the conceptual model.[24] The physical component summary (PCS) subscales are PF, RP, BP, GH, VT, and SF; the mental component summary (MCS) subscales are BP, GH, VT, SF, RE, and MH; and the role/social component summary (RCS) subscales are the RP, BP, GH, SF, and RE. We used the SF-36v2 standard version, which is scored with 50 points as the Japanese national standard[25] and 10 points as the standard deviation. The higher the score, the better the health status. The goodness-of-fit index was 0.945 for the three-component model.[24]

Health awareness and lifestyle status. The Health-Promoting Lifestyle Profile II, a questionnaire on the health awareness and healthy lifestyle status of the mothers, was developed to measure self-care abilities predicted to be related to the physical and MH of women raising children. The subscales of the Health-Promoting Lifestyle Profile II include health awareness, mental growth, physical exercise, human relationships, nutrition, and stress management. The responses are scored on a four-point Likert scale from 1 to 4, with higher scores indicating healthier lifestyles. Using these questions as a guide, 23 questions appropriate for the mothers were developed. After data collection, a factor analysis was conducted to extract the factors.

Statistical analysis

IBM SPSS Statistics version 27 was used for the analysis. Descriptive statistics were obtained for each variable. The SF-36 score was compared with the national standard value for women of the same age, including women not rearing children. A factor analysis was conducted for health awareness and lifestyle using the principal factor method. The criterion for factor loadings was $\geqslant 0.3$, and Cronbach's alpha coefficients were determined for each factor extracted and for the total. Multiple regression analysis was conducted using the SSS-8 and SF-36 summary scores as dependent variables and each of the attributes, health awareness, and lifestyle factors as independent variables, considering multicollinearity. Age, working status,

Table 1. Characteristics of the participants (n = 253).

Characteristics	Mean (SD)	n (%)
Age (years)	33.7 (4.9)	
Self-reported health		
Somatic Symptom Scale-8	7.3 (5.3)	
PCS	50.5 (7.9)	
MCS	51.8 (9.7)	
RCS	48.3 (10.0)	
Working states		
No employment		78 (30.8)
Employed		123 (48.6)
On childcare leave		52 (20.6)
Number of preschool children		
One		174 (68.8)
Two		64 (25.3)
Three or more		15 (5.9)
Age of youngest child		
0 years old		67 (26.5)
1 year old		93 (36.8)
2 years old		68 (26.9)
3 years old		25 (9.9)
Having children attending preschool or kindergarten		
Yes		138 (54.5)
No		115 (45.5)
Persons who support them[a]		
Husband/partner		229 (90.5)
Real mother		171 (67.6)
Friends		64 (25.3)
Others		52 (20.6)
Use of childcare support		
Childcare center		142 (56.1)
Consultation or educational class by local government		39 (15.4)
Midwife-led maternity home		8 (3.2)
Family support system (babysitting)		16 (6.3)
Others		7 (2.8)

MCS: mental component summary; PCS: physical component summary; RCS: role/social component summary.
[a]Multiple responses.

number of children, and age of youngest child were considered as adjustment variables. The significance level was set at 5%.

The reporting of this study conforms to the STROBE statement.[26]

Results

Participant characteristics

The questionnaire was distributed to 324 respondents, and 259 participants responded. Ultimately, 253 valid responses were included in the analysis (collection rate: 79.9% and valid response rate: 78.1%) after excluding invalid responses with missing values. Table 1 presents the participant characteristics. The average age of the participants was 33.7 ± 4.9 years, and 48.6% were employed.

Self-reported health of child-rearing mothers

Table 2 presents the responses to the SSS-8. The mean SSS-8 total score was 7.3 ± 5.3. More than 70% of the participants reported experiencing "back pain" and "feeling tired or having low energy" to some degree. Approximately 60% of participants claimed that they had trouble sleeping. Table 3 presents the comparison of the SF-36 PCS, MCS, and RCS scores between study participants and the national standard value rated in 2017, which is a standard score for the same sex and age group based on the results of a survey conducted in Japan. In all age groups, the PCS scores were below the national standard, indicating lower physical QoL among the participants in this study than the average for the same age group, including women who did not have children. In contrast, the MCS score was higher than the national standard in all age groups, indicating higher mental QoL among the participants in this study than the average for the same age group, including women who did not have children.

Health awareness and lifestyle

Table 4 presents the results of the factor analysis of health awareness and lifestyle. Three factors, which were termed "coping with stress," "health-promoting behavior," and "optimistic thinking," were extracted under factor loadings of >0.3. These three factors were used to assess health awareness and lifestyle habits.

Factors affecting health status

Multiple regression analysis was conducted using maternal characteristics and health awareness/lifestyle factors as independent variables and physical and MH status (SSS-8, PCS, MCS, and RCS) as dependent variables. Considering multicollinearity, Spearman's rank correlation coefficient and phi coefficient between independent variables were calculated, and two independent variables, "having children attending preschool or kindergarten" and "use of childcare support centers," were excluded from the independent variables based on a standard of $\geqslant 0.5$.

Table 5 presents the results of the multiple regression analysis using SSS-8, PCS, MCS, and RCS as the dependent variables. Working status (employed), coping with stress, and optimistic thinking affected SSS-8 (regression coefficient $(B) = -1.57$, $p < 0.01$; $B = -0.50$, $p < 0.01$; $B = -1.18$, $p < 0.01$; respectively). Having more than two children and use of maternity homes affected PCS ($B = 2.85$, $p < 0.01$; $B = 6.59$, $p < 0.05$). The use of consultation or parenting classes by local government service, coping with

Table 2. Responses by items of the Somatic Symptom Scale-8 (n = 253).

	n (%)				
Items	Not at all	A little bit	Somewhat	Quite a bit	Very much
Stomach or bowel problem	181 (71.5)	29 (11.5)	36 (14.2)	5 (2.0)	2 (0.8)
Back pain	72 (28.5)	50 (19.8)	63 (24.9)	43 (17.0)	25 (9.9)
Pain in your arm, leg, or joints	127 (50.2)	41 (16.2)	54 (21.3)	21 (8.3)	10 (4.0)
Headaches	104 (41.1)	57 (22.5)	60 (23.7)	20 (7.9)	12 (4.7)
Chest pain or shortness of breath	206 (81.4)	19 (7.5)	21 (8.3)	3 (1.2)	4 (1.6)
Dizziness	182 (71.9)	41 (16.2)	23 (9.1)	6 (2.4)	1 (0.4)
Feeling tired or having low energy	73 (28.9)	79 (31.2)	58 (22.9)	32 (12.6)	11 (4.3)
Trouble sleeping	100 (39.5)	80 (31.6)	52 (20.6)	17 (6.7)	4 (1.6)

Table 3. Comparison of 36-Item Short-Form Health Survey component summary score.

	Study participants (n = 253)	National standard (Japanese female, 2017; n = 731)
Characteristics	n (%)	n (%)
Age		
20s	67 (26.5)	188 (25.7)
30s	158 (62.5)	257 (35.2)
40s	28 (11.0)	286 (39.1)
	Mean (SD)	Mean (SD)
PCS		
20s	49.2 (8.0)	53.7 (9.8)
30s	51.5 (7.7)	53.2 (8.7)
40s	47.9 (8.5)	51.6 (9.8)
MCS		
20s	52.2 (10.2)	47.3 (9.7)
30s	51.8 (9.9)	47.0 (10.9)
40s	51.2 (7.0)	46.4 (11.0)
RCS		
20s	47.8 (8.5)	47.6 (11.5)
30s	47.7 (10.4)	48.8 (11.4)
40s	53.1 (10.3)	49.8 (11.1)

MCS: mental component summary; PCS: physical component summary; RCS: role/social component summary.

stress, and optimistic thinking affected MCS ($B = 3.36$, $p < 0.05$; $B = 0.81$, $p < 0.01$; $B = 3.46$, $p < 0.01$). The age of the youngest child ($\geqslant 1$ year) and optimistic thinking affected RCS ($B = 3.30$, $p < 0.05$; $B = 1.60$, $p < 0.01$).

Discussion

Physical symptoms of women rearing infants and toddlers

Participants in this study exhibited a higher MCS score than women of the same age but reported experiencing physical symptoms such as body pain and fatigue in the SSS-8 and exhibited lower PCS scores than their peers. The average SSS-8 score of the participants in this study was 7.3, which is higher than the score of respondents from a survey conducted in Germany.[20] German women of the same age in the general population had scores of 89th percentile for score 5 and 92nd percentile for score 6. Therefore, Japanese women raising children in this study were experiencing some higher physical symptoms.

Regarding physical QoL, the BP was lower than that of women of the same age group. The mean values of the BP were 43.8, 45.8, and 44.5 among women in their 20s, 30s, and 40s, respectively, which were lower than Japanese population norms (for Japanese women, including women without children) of 49.9, 50.2, and 49.9 among women in their 20s, 30s, and 40s, respectively,[25] for all age groups. Furthermore, it was lower than the average of 46.8 for Japanese women in their 70s, revealing extremely low physical QoL of Japanese mothers raising children under the age of 3 years. Low PCS was strongly influenced by the pain score. A review of previous studies of women in the first-year postpartum reported a high prevalence of ongoing back pain in various countries.[17] Low back pain occurs by the relaxation of the muscles, joints, and ligaments around the pelvic region owing to uterine enlargement due to pregnancy and hormone relaxin. In most cases, the pain disappears in the early postpartum period; however, for some mothers, the pain persists beyond 1 month postpartum owing to the presence of prepregnancy backpain, antenatal and postnatal weight management, and physical strain during childbirth. Tendonitis is more likely to occur in postpartum women. Effective interventions for the "pain" suffered by women during childcare remain lacking; therefore, prevention and enhancement of self-care are essential.

Factors affecting women's health status

Being employed, coping with stress, and optimistic thinking decreased the SSS-8 scores. This implies that employed participants with the ability to cope with stress and optimistic thinking were less likely to suffer from physical

Table 4. Factor analysis of health awareness and lifestyle (n = 253).

Factor component	Stress coping	Health-promoting behavior	Optimistic thinking
Can you rest when you are tired?	0.606	0.171	−0.069
Do you have a stress management plan?	0.588	0.093	0.209
Do you take time for yourself?	0.508	0.078	0.148
Can you talk to your partner about anything?	0.471	0.099	0.047
Do you value skinship?	0.434	0.105	0.149
Are you good at communicating your feelings?	0.394	0.12	0.08
Do you seek professional help when you need it?	0.392	0.197	0.032
Do you check your weight regularly?	0.072	0.528	0.122
Do you have checkups and gynecological examinations?	0.168	0.486	0.032
Do you care about your health?	0.041	0.453	0.245
Do you eat a well-balanced diet?	0.301	0.409	−0.045
Do you get exercise in your daily life?	−0.013	0.341	0.113
How many hours of sleep do they get?	0.171	0.328	0.026
Do you eat breakfast?	0.173	0.300	−0.065
Are you excited about the future?	0.289	−0.160	0.704
Do you think you are growing as a person?	0.154	0.123	0.557
Principal axis factoring (varimax rotation), the factor loadings: >0.3			

symptoms. Women on leave or unemployed women raising children reported more physical problems and worries than working women. Most Japanese working women leave their infants in nursery school during the day, whereas nonworking women spend most of their days with their children and handle childcare and general housework alone. Known as "one-operator child care," women in nuclear families isolated from the support of their corporate-employed husbands has become a major challenge to child-rearing in Japan. Japanese husbands with children younger than 6 years spend 83 min/day on housework and childcare, which is lower than that in other developed countries. The total time spent by Japanese couples on housework and childcare is not particularly long compared with that in other countries; however, the time spent on childcare is 4 h and 34 min, which is longer than that in other developed countries.[27] This might be one of the reasons underlying nonworking Japanese women experiencing more physical symptoms than working women.

The PCS was positively associated with having more than two children and using maternity homes regardless of employment. Previous studies on Japanese mothers have also revealed a higher incidence of hand/wrist tendinitis among first-time mothers,[28] indicating that mothers with less childcare experience face a greater physical burden. In addition, women who choose a midwifery center as their place of birth are required to have a normal pregnancy as a condition of acceptance. The self-care activities and health guidance provided by midwives may improve women's physical health. However, births at midwifery centers with such benefits account for only 0.57% of all births in Japan,[29] and this percentage is declining annually. Furthermore, a healthy lifestyle (coping with stress, health-promoting behaviors, and optimistic thinking) had no effect on the PCS. Loh et al. reported the effect of health-promoting behaviors, stress-coping, and optimistic thinking on QoL among Australian mothers.[30] Notably, Loh et al. measured QoL using the Quality-of-Life Enjoyment and Satisfaction Questionnaire, which is different from the SF-36 used in this study. The SF-36 enables the measurement of the influencing factors, particularly physical QoL, such as the PCS. The results showed that the PCS of participants in this study was lower in all age groups (20s, 30s, and 40s) than the national norm for the same age group, including women not raising children. This might indicate that the physical QoL of Japanese mothers raising children has declined to a level that cannot be improved through general self-care practices, and improving the content of health education, particularly focusing on the physical health of women raising children, is necessary.

The MCS scores were significantly higher among those who used consultations or parenting classes through local government services than among those receiving support from family and friends. This indicates a positive impact of strengthening the policy of child-rearing support in Japan on the MH of women during child-rearing. The services provided by local governments include various enhanced initiatives, such as postnatal care projects, pregnancy and childbirth preparation classes, childcare education classes, and postnatal care salons. Our findings indicate that these services can improve the MH of child-raising women. Similar to the SSS-8, stress-coping skills and optimistic thinking also enhanced the MCS.

Caring for a child younger than 1 year negatively impacted the RCS. In the conceptual model of the three-component score used in Asian countries, RP, RE, and SF contribute significantly to the RCS.[24] During the first year

Table 5. Factors affecting women's health status (n = 253).

Independent variables		SSS-8			PCS			MCS			RCS		
		B	*SE*	p	*B*	*SE*	p	*B*	*SE*	p	*B*	*SE*	p
Maternal													
Age	0 = younger than 35 years, 1 = 35 years and older				−1.83	1.00	0.07						
Working states	0 = unemployed or on leave, 1 = employed	−1.57	0.62	0.01									
Children													
Number of children	0 = one, 1 = more than two				2.85	1.07	0.01						
Age of youngest child	0 = 0 years, 1 = older than 1 year										3.30	1.48	0.03
Reliable supporter													
Husband	0 = no, 1 = yes							3.48	1.77	0.05			
Real mother		1.09	0.65	0.09				2.00	1.08	0.07			
Friends													
Use of child-care support													
Consultation/class	0 = no, 1 = yes							3.36	1.38	0.02			
Maternity home					6.59	2.83	0.02				−6.08	3.67	0.10
Family-support system		−2.10	1.24	0.09									
Healthy lifestyle													
Coping with stress	Higher scores indicate higher subjective health.	−0.50	0.10	<0.01				0.81	0.17	<0.01			
Health-promoting behavior													
Optimistic thinking		−1.18	0.29	<0.01				3.46	0.46	<0.01	1.60	0.56	<0.01
		$R^2 = 0.199$ ($p < 0.01$)			$R^2 = 0.050$ ($p < 0.01$)			$R^2 = 0.356$ ($p < 0.01$)			$R^2 = 0.062$ ($p < 0.01$)		

Stepwise backward method.
B: regression coefficient; MCS: mental component summary; PCS: physical component summary; RCS: role/social component summary; *SE*: standard error; SSS-8: Somatic Symptom Scale-8.

after childbirth, women experience various physical discomforts, such as tiredness, headache, and neck, shoulder, and back pain.[4] Furthermore, raising a child under 1 year of age is extremely demanding and difficult in the context of nuclear families and declining birth rates. In Japan, the proportion of single-person households is the highest at 32.9%, and accounting for 24.5% of households consisting of just a married couple, households without children total more than half of all households. Child-rearing is no longer the norm in modern Japanese society. The total fertility rate is 1.26, and many first-time mothers struggle to find role models for raising infants. Additionally, children under 1 year of age require care in all aspects of their lives, including eating, excretion, sleeping, moving, and walking, along with endless care and support in daily life from family members rather than public support. Consequently, women raising children under 1 year exhibit a lower RCS score, thereby requiring more various kinds of public support including support for everyday life.

Limitations

This study has some limitations. First, our participants were limited to women raising infants and toddlers living in a single city in western Japan, restricting the generalizability of our findings to women living in different areas. In addition, the study sites were selected through snowball sampling, including childcare support centers used by women on parental leave and housewives and nursery schools used by employed women. However, the possibility of similar lifestyles among participants is undeniable. Second, the questionnaire items on health promotion behaviors were originally designed using the Health Promotion Lifestyle Profile II. This scale was not designed for women raising children. Therefore, the results may not reveal the impact of health promotion behaviors on QoL or physical health of women raising children. Consequently, further research is warranted to determine the health-promoting behaviors of women raising infants and toddlers that contribute to their well-being. Third, previous studies have identified instruments (e.g. SF-12, WHOQoL-GRAV, and PQoL) to measure self-reported QoL during pregnancy and the postpartum period and have evaluated their validity using consensus-based standards for the selection of health measurement instruments to define and categorize psychometric properties.[31,32] Further investigation is required to identify the valid measurements for assessing the HRQoL of women raising infants and toddlers.

Conclusions

The PCS score of the participants was below Japanese population norms for all the age groups. In contrast, the MCS score was higher than Japanese population norms in all age groups. Employment, stress-coping skills and optimistic thinking were associated with fewer physical symptoms. Having more than two children and use of maternity-home services were positively associated with the PCS. Moreover, availing consultations or parenting classes provided by the local government, coping with stress, and optimistic thinking were positively associated with the MCS. Age of the youngest child (⩾1 year) and optimistic thinking were positively associated with the RCS. Our findings indicate the requirement of further specific measures to improve the physical health of women raising children, specifically first-time mothers and housewives. Additionally, focusing on public health research on the effectiveness of interventions is crucial to improving the physical and MH and fatigue among women raising infants. These interventions include self-care strategies, such as preventing back pain and tendonitis and relaxation techniques through collaborating with physical therapists and utilizing public services for child-rearing support.

Acknowledgements

We would like to thank all the participants who completed the questionnaire, as well as the institutes, for their cooperation.

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Ethical considerations

The study was approved by the Graduate School of Biomedical Sciences, Health Science Courses, Ethics Committee (ref: 21011402). All procedures adhered to the ethical standards of the responsible committee on human experimentation and the Helsinki Declaration and Ethical Guidelines for Medical and Health Research Involving Human Subjects.

Consent to participate

The research participants were provided written explanations of the study purpose and voluntary participation. Informed consent for the study was obtained from all participants through a self-addressed envelope returned by the participants, as well as from mothers whose children were involved in the study. The questionnaire survey was conducted anonymously to maintain confidentiality. All information obtained was kept confidential and password protected.

Author contributions

Haruna Ishibashi and Wakako Fujita: Conceived the idea of the study and implemented the study.
Sumihisa Honda: Developed the statistical analysis plan and conducted statistical analyses.
Haruna Ishibashi: Interpreted results and drafted the original manuscript.
Wakako Fujita: Supervised the study.
All authors reviewed the manuscript draft and revised it critically on intellectual content.
All authors read and approved the final manuscript.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The authors declare that no funds or grants were received to conduct this study. The Nagasaki University Center for Diversity and Inclusion, Women Researchers Support Office, provided support for preparing this manuscript.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability statement

The datasets generated and/or analyzed during the current study are not publicly available to maintain the anonymity of the participants. The data can be obtained from the corresponding author upon reasonable request.

Supplemental material

Supplemental material for this article is available online.

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