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Original Article

A study on postpartum symptoms and their related factors in Korea

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ABSTRACT

Objective: This study was aimed to identify the physical and mental state of women after delivery, to investigate the factors that influence those, and to examine the effects of postpartum care performance, which is traditionally believed to be appropriate care in Korea, on women's physical and mental status.
Materials and Methods: A total of 148 women who visited our hospital for postpartum check-up on the 2nd week or 6th week after delivery were selected. We researched postpartum care methods using a questionnaire and had the women self-evaluate their postpartum symptoms. Depression was evaluated using the Beck Depression Inventory.
Results: The average points of the 27 postpartum symptoms was 2.70 points (from 1 = very good to 5 = very bad). Seventy-two women had depression. Factors related to postpartum symptoms and depression were smoking before pregnancy, low marital satisfaction, bad mood during and after pregnancy, lack of support from husbands, and bad quality of sleep during puerperium. Treating the joints of hands carefully when milking breasts, and avoiding squatting down, demonstrated a negative correlation with the average points of postpartum symptoms. Multivariate linear regression analysis showed that mood during puerperium and Beck Depression Inventory points were significant factors related to the average points of postpartum symptoms and that the degree of support from husbands and mood during pregnancy were statistically related with depression.
Conclusion: Many women complained of postpartum discomfort. Although, while some postpartum care methods which are traditionally believed to be appropriate care in Korea can be helpful to women's recovery, most of them are not. We confirmed that physical symptoms and depression are closely related to each other.

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Introduction

Lasting up to 6 weeks, the puerperium is the period after childbirth during which the female reproductive system recovers from pregnancy and returns to the prepregnant state [1]. During the puerperium, many women complain of symptoms such as fatigue, headache, breast pain, backaches, arthralgia, chills or sweating, loss of appetite, nausea, anxiety, and depression [2]. Some of these complaints are serious obstacles in daily life, and these symptoms can continue for months or even years after childbirth. However, most obstetricians treat women only during

pregnancy and consider the health of the fetus, devoting comparatively less interest to the physical and mental recovery of women after giving birth [3].

Traditionally, people in Korea, China, and other parts of East Asia consider postpartum care very important. For example, according to traditional Chinese customs, women should be confined to the home and assisted with tasks for 1 month after giving birth. This restricted postpartum care performance is referred to as "doing-the-month" [4]. This postpartum care performance, which comprises the activities in which women participate to recover from the physical and mental discomfort they endured at the time of delivery, helps them to return to their healthy nonpregnant condition. When postpartum care is not performed properly, Koreans believe that various symptoms of discomfort arise and can last for a lifetime [5]. However, few systematic studies have examined the symptoms women experience after childbirth or have assessed their prevalence, cause, pathophysiology, and prevention. Consequently, there

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is currently no scientific evidence supporting the need for post-partum care.

Therefore, we studied the physical and mental conditions of women after delivery to identify factors influencing their condition and to determine how traditional Korean postpartum care affects the physical and mental health of women after giving birth.

Materials and methods

Samples

One hundred and ninety-two women who gave birth after the 28th week of pregnancy and visited the outpatient clinic for a routine postpartum check-up on the 2nd week or 6th week in Kangwon National University Hospital, Chuncheon, Korea from August 2011 to July 2012 were selected. All of them agreed to participate in this study. The cases with multifetal gestation, fetal abnormality, maternal cardiovascular disease, endocrine disease before or during pregnancy, postpartum hemorrhage to the degree where blood transfusion was required, and puerperal infection that required antibiotic treatment for over 7 days were excluded. A total of 148 women with no underlying disease were finally selected.

Measurement

Characteristics of the study population

We researched sociodemographic characteristics with a questionnaire, and asked the patients to self-evaluate their marriage as well. Considering the Confucian cultural background of Korea, information on relationships with their parents-in-law were included. "Very dissatisfied" being 1 point and "very satisfied" was 5 points. Patients were asked about whether this pregnancy was planned, whether she attended work during the pregnancy period, whether she exercised or smoked, weight increase and mood, and the degree of support from their husbands during pregnancy. "Very dissatisfied" was 1 point and "very satisfied" was 5 points. About the puerperal period, place of postpartum care, person who helped with the postpartum care, feeding method (breast feeding or bottle feeding), intake of health foods, amount of dietary intakes, sleeping hours and quality, and returning to the household chores and work were researched. In addition, patients were asked to self-evaluate their mood and the degree of support from their husbands during the puerperium.

Self-evaluation of the recognition on postpartum care

Participants were asked to self-evaluate their awareness of postpartum care. "I do not know at all" was 1 point and "I know very well" was 5 points.

Evaluation by postpartum care givers

We developed evaluation questions on the basis of the postpartum care method that is being traditionally conducted in Korea, which presented in several studies by the College of Oriental Medicine in Busan, Korean and the College of Nursing in Busan, Korea [6–11]. The evaluation consists of a total of 15 questions, and was measured with a 5-point scale. "I did none of the time" was 1 point and "I did all the time" was 5 points. Also, based on the average points of each question the average points of postpartum care performance were calculated.

Self-evaluation on general health condition during the puerperium

At the time of filling out questionnaire, participants were asked to self-evaluate their health condition subjectively, and for the 5-point scale, 1 point being "completely recovered" and 5 points

being "not recovered at all," the higher points signified bad health conditions.

Self-evaluation on postpartum symptoms

Based on postpartum symptoms complained by Koreans that was researched in America in 2005 and in Sweden in 2007 [3,12], and on studies presented by the College of Oriental Medicine of Korea [7–11], a total of 27 types of symptoms were selected and evaluated. The degree of seriousness of each symptom was evaluated into five stages, and the higher points signified bad health conditions. Also, based on the average points of each question the average points of postpartum symptoms were calculated.

Self-evaluation on the depression

The degree of depression was evaluated using a screening tool, the Beck Depression Inventory (BDI). This tool is composed of 21 questions of the self-reported type. Each question evaluates the seriousness and consists of 0–3 points and a total 4-point scale, with the higher points signifying the seriousness of postpartum depression. Higher total scores indicate more severe depressive symptoms. This test can be summarized in four stages; 0–9 points signifies a normal nondepressive condition, 10–15 points indicates mild depression, 16–23 indicates moderate depression, and 24–63 points indicates severe depression.

Statistical analyses

Data analysis and research of the validity of measurement tools for verifying the reliability of the model fit and exploratory factor analysis was conducted and Cronbach α coefficient of internal consistency coefficient was calculated. Comparison between the two groups used the Student t test and Chi-square test, and correlation coefficients were calculated to identify depression and postpartum symptom related factors. Multivariate analysis on the influencing factors on depression and postpartum symptoms was conducted, and multiple linear regression analysis was implemented to find out the degree of contribution of each factor. The statistical significance was set at $p < 0.05$. SPSS version 19.0 (SPSS Inc., Chicago, IL, USA) was used for the statistics process.

Results

Cronbach α for questions was 0.69

Sociodemographic characteristics

Fifty nine (39.9%) women were aged between 30 years and 34 years. They were all married. Ten women (6.8%) smoked before pregnancy. None had lower than a high school graduate. For the annual net income, 25–35 million won and 35–45 million won were the highest incomes (30.2% and 26.2%, respectively), and this was no different from the average annual net income per household of the year 2011 in South Korea. Most of them were satisfied with their marriage with an average of 4.38 points, and for satisfaction with their parents-in-law, they were mostly satisfied with an average of 3.96 points (Table 1).

Characteristics related to the pregnancy and delivery

Forty-five (30.4%) participants worked during pregnancy and 43 (29.1%) women stopped working or took a leave of absence from work. Thirty-five (24.0%) participants received education on the pregnancy and childbirth, and 37 (25.0%) women exercised during pregnancy. For the exercise type, the most common exercises were walking, relaxation, and exercise for natural birth, strolling, followed by yoga and cycling. There were no participants who smoked during the pregnancy. For mood during the pregnancy, it was

Table 1
Sociodemographic characteristics of the study population.

	Variables	Frequency	%
Time of data collected	1–2 wks after delivery	87	58.8
	5–6 wks after delivery	61	41.2
Age (y)	20–24	7	4.7 [a]
	25–29	50	33.8
	30–34	59	39.9
	35–39	27	18.2
	≥40	5	3.4
Married state		148	100.0
Primiparous		83	56.1
Smoking before pregnancy		10	6.8
Education state	High school	40	27.0
	Junior college	58	39.2
	College	39	26.4
	Graduate school	11	7.4
Religion	None	86	58.1
	Christian	32	21.6
	Catholic	6	4.1
	Buddhist	18	12.2
	Other	6	4.1
Occupation	Unemployed	78	52.7
	Professional	43	29.1
	Employed	7	4.7
	Employee	9	6.1
	Other	11	7.4
Occupation of husband	Unemployed	1	0.7
	Professional	59	39.9
	Employed	22	14.9
	Employee	26	17.6
	Other	40	27.0
Annual net income of family (1000won)	≥55,000	20	13.8
	45,000–55,000	14	9.7
	35,000–45,000	38	26.2
	25,000–35,000	44	30.3
	15,000–25,000	23	15.9
	<15,000	6	4.1
		Mean ± SD	**Range**
Satisfaction with marriage (score)		4.38 ± 0.62	1–5 [b]
Satisfaction with parents in law (score)		3.96 ± 0.77	1–5 [b]

SD = standard deviation.
[a] Percentage except missing value.
[b] Summary score: from 1 = very dissatisfied to 5 = very satisfied.

generally good with an average of 3.63 points, and for the evaluation of the support from husbands during the pregnancy, they were generally satisfied with 3.77 points. The average gestational weeks at delivery was 37.7 weeks (Table 2).

Degree of knowledge of postpartum symptoms and postpartum care methods

Self-evaluation on the knowledge of postpartum symptoms and Korean-style postpartum care methods was intermediate-level with 3.01 points and 3.36 points. The need for Korean-style postpartum care performance was 3.93 points. Most participants believed that they need postpartum care and Korea-style postpartum care (Table 3).

Characteristics of the puerperal period

About half of women who received postpartum care received it at a postpartum care center with 67 cases (45.3%), and was followed by receiving care from their mother at home with 38 cases (25.0%). Seventy women (47.3%) took health foods. Among them, 51 were eating pumpkin juice and 38 were taking oriental medicine. The rest ate snakehead fish, carp, or vitamins. For the food amount intake, there were 54 cases (36.5%) of similar level and cases of decreased level than before they got pregnant was 46 (31.1%). Although most of the women were breast-feeding, a considerable number showed similar or decreased level of the intake food

amount. The sleeping hours significantly decreased on the 6th week with 5.75 hours from the 2nd week of 6.51 hours, and the quality of sleep decreased on the 6th week of 2.48 points from the 2nd week of 2.83 points. However, more women returned to infant care and household chores on the 6th week compared with the 2nd week. Mood during puerperium was reported to be good with an average of 3.47 points (Table 4).

Performance of the Korean-style postpartum care

The average score of Korean-style postpartum care performance was 3.11 points, which was the average level. Among the performance categories, they were doing their best at not lifting heavy things and avoiding hard or tough foods. Women took more care on the 2nd week with 3.22 points of the postpartum care performance average points, than the 6th week with 2.92 points (Table 5).

Present postpartum symptoms and depression

The self-evaluation points of health conditions were bad with an average of 3.27 points. However, when the average points of postpartum symptoms regarding the 27 symptoms were obtained, it was not bad with 2.70 points. The most discomforting symptoms were back pain and having cold feelings, and the parts that they felt cold were the joints on their legs and arms, shoulders, back, waist, pelvis, thigh, and teeth. Additionally, women complained about sweating a lot, arthralgia, and wanting to avoid the cold. Comparing

Table 2
Characteristics related with this pregnancy and delivery.

	Variables		Frequency (%)/Mean ± SD	%/Range
Pregnancy	Planned pregnancy		73	49.3
	Antenatal care	Regular	98	66.2
		Irregular	50	33.8
	Employment during pregnancy	Working	45	30.4
		On leave	43	29.1
		No occupation	60	40.5
	Education about pregnancy		35	24.0
	Exercise during pregnancy		37	25.0
	Smoking during pregnancy		0	0
	Weight gain after pregnancy (Kg) [b]		12.14 ± 3.84	5.0–19.5
	Mood during pregnancy (score) [b]		3.63 ± 0.88	1–5 [a]
	Satisfaction with husband's support (score) [b]		3.77 ± 0.86	1–5 [a]
Delivery	GA at delivery (wks) [b]		37.7 ± 2.4	28–41
	Birthweight (g) [b]		3026 ± 513	1750–4250
	Labor duration (h) [b]		8.5 ± 8.5	2–48
	Delivery method [a]	Vaginal delivery	92	62.2
		Elective cesarean section	29	19.6
		Emergent cesarean section	27	18.2
	Use of PCA during labor [a]		70	72.9 [b]
	Sex of newborn [a]	Male	94	64.4 [b]
		Female	52	35.6 [b]
	NICU admission [a]		53.	35.8

NICU = neonatal intensive care unit; PCA = patient controlled analgesia; SD = standard deviation.
[a] Summary score: from 1 = very unhappy or very dissatisfied to 5 = very happy or very satisfied.
[b] Percentage except missing value.

Table 3
Degree of knowledge on postpartum symptoms and postpartum care methods.

Variables	Mean ± SD	Range
Knowledge on postpartum symptoms (score)	3.01 ± 0.91	1–5 [a]
Need for postpartum care (score)	3.99 ± 0.57	1–5 [b]
Knowledge on Korean-style postpartum care methods (score)	3.36 ± 0.86	1–5 [a]
Need for Korean-style postpartum care (score)	3.93 ± 0.53	1–5 [b]

SD = standard deviation.
[a] Summary score: from 1 = I do not know at all to 5 = I know very well.
[b] Summary score: from 1 = no agreement to 5 = complete agreement.

the postpartum symptoms of 2nd week and 6th week, symptoms of sweating a lot, breast pain, and pain around the episiotomy or surgical wound were significantly decreased on the 6th week compared with the 2nd week (Table 6). There were 135 women who answered every question on the depression rating questionnaire, and their average total score of BDI was 10.78 points which falls under a mild depression category. A total of 53.3% showed depression with 48 participates (35.6%) of mild depression, 23 (17.0%) of moderate depression, and one (0.7%) participant with severe depression. The 2nd week and 6th week of the puerperium did not show any significant difference (Table 6).

Factors associated with postpartum care performance, postpartum symptoms, and depression

Women of older age, higher parity, higher educational level, and those who participated in childbirth education paid more effort to the postpartum care. Also women who did not gain much weight during pregnancy, women with good mood during puerperium, good quality of sleep, and those who exercised during puerperium paid more effort to postpartum care. However, there was no correlation between the average points of postpartum care performance and average points of postpartum symptoms. As the average points of postpartum care performance and self-evaluation points of health condition showed statistically significant negative correlation ($r = 0.24$), it was identified that following categories of postpartum care and subjectively good physical condition were related to each other (Table 7).

Smoking before pregnancy showed a significantly positive correlation with average points of postpartum symptoms and BDI total points ($r = 0.229$ and $r = 0.226$, respectively). Also, low marital satisfaction showed a statistically significant negative correlation with the average points of postpartum symptoms and BDI stage ($r = -0.198$ and $r = -0.178$, respectively). Relationship with their parents-in-law showed a statistically significant negative correlation with the BDI stage ($r = -0.177$). Mood during pregnancy showed a statistically significant negative correlation with the average points of postpartum symptoms, BDI stage, and BDI total points ($r = -0.29$, $r = -0.29$, $r = -0.28$, respectively). Also, the support level by husbands during pregnancy showed a statistically significant negative correlation with the average points of postpartum symptoms, BDI stage, and BDI total points ($r = -0.29$, $r = -0.33$, $r = -0.35$). In addition, their mood during puerperium showed statistically significant negative correlations with the self-evaluation points on health condition, average points of postpartum symptoms, BDI stage, and BDI total points ($r = -0.31$, $r = -0.38$, $r = -0.45$, $r = -0.44$). Also, support from husbands during puerperium showed a statistically significant negative correlation with self-evaluation points on health condition, average points of postpartum symptoms, BDI stage, and BDI total points all showed ($r = -0.21$, $r = -0.22$, $r = -0.26$, $r = -0.32$, respectively). The quality of sleep during puerperium showed statistically significant negative correlation with self-evaluation points on health condition, average points on postpartum symptoms, BDI stage, and BDI total points ($r = -0.24$, $r = -0.18$, $r = -0.27$, $r = -0.29$, respectively). These mean that smoking before pregnancy, low marital satisfaction, bad mood during and after pregnancy, lack of support from husbands during and after pregnancy, and bad quality of sleep

Table 4
Characteristics related with puerperal period.

Variables		Total (N = 148)	2 wks postpartum (N = 87)	6 wks postpartum (N = 61)	p
		Frequency (%)/Mean ± SD	Frequency (%)/Mean ± SD	Frequency (%)/Mean ± SD	
Postpartum care place & care giver	Postpartum care center	58 (39.2)	39 (44.8)	19 (31.1)	0.441
	Postpartum care giver at home	32 (21.6)	18 (20.7)	14 (23.0)	
	Mother at home	44 (29.7)	23 (26.4)	21 (34.4)	
	Mother-in-law at home	10 (6.8)	4 (4.6)	6 (9.8)	
	Relative at home	1 (0.7)	1 (1.1)	0 (0.0)	
	Alone at home	3 (2.0)	2 (2.3)	1 (1.6)	
Feeding	Only breast feeding	60 (40.5)	39 (44.8)	21 (34.4)	<0.001
	Breast & bottle feeding	71 (48.0)	46 (52.9)	25 (41.0)	
	Only bottle feeding	17 (11.5)	2 (2.3)	15 (24.6)	
Health foods		70 (47.3)	37 (42.5)	33 (55.0)	0.093
Intake food amount compared with pre-pregnancy	Decreased	46 (31.1)	25 (28.7)	21 (34.4)	0.617
	Similar	54 (36.5)	33 (37.9)	21 (34.4)	
	1~1.2 times increased	32 (21.6)	17 (19.5)	15 (24.6)	
	1.2~1.5 times increased	12 (8.1)	9 (10.3)	3 (4.9)	
	1.5~2.0 times increased	4 (2.7)	3 (3.4)	1 (1.6)	
Satisfaction with husband's postpartum support (score) [a]		3.71 ± 0.85	3.80 ± 0.82	3.57 ± 0.88	0.105
Postpartum mood (score) [a]		3.47 ± 1.03	3.44 ± 1.05	3.51 ± 0.99	0.678
Amount of sleep (h)		6.02 ± 1.63	6.51 ± 1.64	5.75 ± 1.51	0.005
Quality of sleep (score) [b]		2.68 ± 0.83	2.83 ± 0.84	2.48 ± 0.74	0.010
Household chores (score) [c]		2.17 ± 0.84	1.85 ± 0.64	2.62 ± 0.88	<0.001
Return to work (score) [d]		1.10 ± 0.39	1.07 ± 0.34	1.14 ± 0.44	0.242
Outdoor activity (score) [c]		1.59 ± 0.68	1.37 ± 0.55	1.90 ± 0.72	<0.001
Exercise (score) [c]		1.59 ± 0.69	1.63 ± 0.71	1.54 ± 0.65	0.430

SD = standard deviation.
[a] Summary score: from 1 = very dissatisfied or very unhappy to 5 = very satisfied or very happy.
[b] Summary score: from 1 = very bad to 5 = very good.
[c] Summary score: from 1 = none of the time to 5 = all the time.
[d] Summary score: from 1 = not yet to 5 = completely return.

Table 5
Degree of the Korean-style postpartum care performance.

Variables[a]	Total (N = 148)	2 wks postpartum (N = 87)	6 wks postpartum (N = 61)	p
	Mean ± SD	Mean ± SD	Mean ± SD	
Keeping all windows sealed	3.11 ± 0.96	3.21 ± 0.92	2.97 ± 1.00	0.117
Heating up the floor	2.40 ± 1.07	2.56 ± 1.00	2.16 ± 1.14	0.025
Covering whole body with blanket	2.45 ± 0.95	2.52 ± 0.91	2.36 ± 1.00	0.325
Wearing long underwear & socks	3.23 ± 0.99	3.34 ± 0.93	3.07 ± 1.06	0.091
Ingesting a broad variety of food	3.19 ± 0.88	3.33 ± 0.86	2.98 ± 0.87	0.016
Avoiding cold things including water	3.47 ± 1.06	3.60 ± 1.04	3.28 ± 1.07	0.071
Avoiding hard or tough foods	3.71 ± 0.95	3.89 ± 0.96	3.46 ± 0.89	0.007
Not bending excessively at the waist or back	3.43 ± 0.91	3.57 ± 0.90	3.22 ± 0.90	0.023
Not lifting heavy things	3.86 ± 0.73	4.02 ± 0.66	3.63 ± 0.75	0.001
Avoiding to keep same standing or sitting position for a long time	3.43 ± 0.90	3.53 ± 0.82	3.30 ± 0.99	0.119
Treating the joints of hand with care when milking breasts	2.84 ± 1.21	2.72 ± 1.05	3.02 ± 1.40	0.150
Avoiding to hold babies too long	2.86 ± 1.05	3.10 ± 0.99	2.52 ± 1.04	0.001
Avoiding to squat down	3.36 ± 0.92	3.46 ± 0.85	3.23 ± 1.01	0.134
Washing areas that need to be washed in short time without taking shower	2.63 ± 1.17	2.79 ± 1.18	2.39 ± 1.11	0.041
Gargling without a toothbrush	2.49 ± 1.16	2.57 ± 1.22	2.36 ± 1.08	0.272
Average point of Korean-style postpartum care performance	3.11 ± 0.55	3.22 ± 0.52	2.92 ± 0.56	0.001

SD = standard deviation.
[a] Summary score: from 1 = none of the time to 5 = all the time.

during puerperium are related to the postpartum symptoms and/or depression (Table 7).

Correlation between the postpartum care categories and presenting symptoms

Considering the Pearson's r of each item of the postpartum care and 27 postpartum symptoms, avoiding to squat down statistically showed a significantly negative correlation with discomfort in the lower abdomen, indigestion symptoms, pain on half of the body, generalized edema, insomnia, and headache (r = −0.30, r = −0.27, r = −0.26, r = −0.22, r = −0.21, r = −0.20, respectively). This signifies that not squatting down and not having the discomfort symptoms listed above are related to each other. However, avoiding hard or tough food statistically showed a significantly positive correlation with back pain, cervical pain, and a symptom of sweating a lot with r = 0.19, r = .18, and r = 0.18, respectively, and rather than the possibility of having these discomforting symptoms because they avoided hard or tough food, the possibility of strictly avoiding these hard or tough foods because of these symptoms seems to be more plausible (Table 8).

The postpartum care categories that had the closest relationship with the average points of postpartum symptoms were treating the joints of the hand with care when milking their breasts and avoiding squatting down (r = −0.24 and r = −0.22, respectively; Table 8).

Multivariable linear regression analysis

When multivariate linear regression analysis was conducted by applying marital satisfaction, relationship with parents-in-law, smoking status, degree of support from husbands during

Table 6
Present postpartum symptoms and depression.

Variables		Total (N = 148)	2 wks postpartum (N = 87)	6 wks postpartum (N = 61)	p
		Mean ± SD/Frequency (%)	Mean ± SD/Frequency (%)	Mean ± SD/Frequency (%)	
Postpartum symptoms[a]	Hating coldness	3.25 ± 0.90	3.34 ± 0.86	3.11 ± 0.95	0.127
	Having cold feelings	3.45 ± 0.87	3.51 ± 0.79	3.38 ± 0.97	0.376
	Tingling sensation	2.68 ± 0.81	2.68 ± 0.80	2.69 ± 0.83	0.964
	Arthralgia	3.35 ± 0.96	3.34 ± 0.94	3.36 ± 1.00	0.885
	Back pain	2.99 ± 1.09	2.90 ± 0.97	3.11 ± 1.24	0.231
	Cervical pain	3.03 ± 1.08	3.01 ± 1.02	3.07 ± 1.68	0.765
	Lumbar pain	3.55 ± 1.05	3.54 ± 1.01	3.56 ± 1.10	0.922
	Pelvic pain	2.88 ± 1.01	2.94 ± 1.01	2.80 ± 1.01	0.414
	Pain on the half of body	2.35 ± 0.74	2.39 ± 0.69	2.30 ± 0.80	0.438
	Generalized edema	2.75 ± 0.97	2.78 ± 1.02	2.70 ± 0.90	0.637
	Lower abdominal pain	2.65 ± 0.84	2.60 ± 0.80	2.72 ± 0.90	0.380
	Dysuria	2.29 ± 0.88	2.36 ± 0.94	2.20 ± 0.79	0.281
	Loss of appetite	2.63 ± 1.09	2.72 ± 1.14	2.51 ± 1.01	0.253
	Indigestion	2.30 ± 0.85	2.27 ± 0.76	2.34 ± 0.96	0.607
	Chest discomfort	2.34 ± 0.86	2.31 ± 0.86	2.38 ± 0.86	0.622
	Sweating a lot	3.39 ± 1.19	3.58 ± 1.19	3.11 ± 1.13	0.018
	Wound pain	2.81 ± 1.00	3.06 ± 0.95	2.48 ± 0.98	<0.001
	Facial pain	2.20 ± 0.77	2.21 ± 0.79	2.18 ± 0.74	0.794
	Headache	2.68 ± 1.09	2.62 ± 1.09	2.75 ± 1.11	0.464
	Breast pain	2.93 ± 1.12	3.23 ± 1.07	2.52 ± 1.07	<0.001
	Palpitation	2.08 ± 0.70	2.14 ± 0.73	2.00 ± 0.66	0.228
	Dyspnea	2.06 ± 0.69	2.07 ± 0.66	2.05 ± 0.74	0.849
	Constipation	2.78 ± 1.20	2.82 ± 1.20	2.72 ± 1.21	0.631
	Diarrhea	2.02 ± 0.82	1.96 ± 0.78	2.10 ± 0.88	0.329
	Hemorrhoid	2.63 ± 1.14	2.71 ± 1.16	2.52 ± 1.11	0.334
	Insomnia	2.17 ± 0.85	2.22 ± 0.80	2.11 ± 0.92	0.477
	Lethargy	2.64 ± 0.99	2.64 ± 1.02	2.64 ± 0.97	0.996
Average point of the postpartum symptoms (score) [a]		2.70 ± 0.43	2.75 ± 0.43	2.65 ± 0.43	0.176
Self-evaluation point of health condition (score) [b]		3.27 ± 0.84	3.25 ± 0.81	3.30 ± 0.88	0.764
BDI total point (score)		10.78 ± 5.53	10.32 ± 5.37	11.38 ± 5.73	0.275
BDI stage	Normal	63 (46.7)	40 (51.9)	23 (39.7)	
	Mild depression	48 (35.6)	25 (32.5)	23 (39.7)	
	Moderate depression	23 (17.0)	12 (15.6)	11 (19.0)	
	Severe depression	1 (0.7)	0 (0.0)	1 (1.7)	0.376

BDI = Beck Depression Inventory; SD = standard deviation.
[a] Summary score: from 1 = absent from symptoms to 5 = heavily suffering from symptoms.
[b] Summary score: from 1 = very good to 5 = very bad.

pregnancy, mental condition during pregnancy, degree of support from husbands during the puerperium, mental condition during the puerperium, sleeping hours and quality of sleep during the puerperium, average points of postpartum care performance, and BDI stage to find out if they are related to the average points of postpartum symptoms, it was identified that mental condition during the puerperium and BDI points were statistically significant factors (unstandardized coefficients, b = 2.311 and b = 3.112, respectively). To find out if they are related to the average points of BDI points, multivariate linear regression analysis was conducted by applying the above mentioned variables. The result was that the degree of support from husbands during pregnancy and mental condition during pregnancy were statistically significant factors (unstandardized coefficients, b = 1.415 and b = 1.542, respectively).

Discussion

Although many women complain of postpartum discomfort, there is little systematic research on the physical and mental conditions of women after giving birth. This study examined the physical and mental states of women after childbirth to identify the factors that influence their physical and mental health and examine the effects of the traditional postpartum care women receive in Korea. Additionally, the mutual influence of physical and mental health was evaluated.

The postpartum conditions most women complain about involve discomfort rather than disease. Therefore, this study evaluated 27 postpartum symptoms. Although the postpartum status was not poor, their overall self-assessed health status was poor. Most of the symptoms lasted until the end of the postpartum period (i.e., 6 weeks after childbirth). These results were similar to the few previous reports. Korean women in the postpartum period complain of feeling "cold," which is an ambiguous expression; however, even in the West, women often complain of paresthesias of the hand [3,12,13]. The pathophysiology of these symptoms is not clear, but excessive use of the joints while they are still loose and a temporary sensory disorder based on autonomic nervous system dysfunction related to the contraction and dilatation of blood vessels are potential causes.

This study found little correlation with demographic factors. Women who had smoked before pregnancy or reported lower levels of marital satisfaction were not in good physical condition after childbirth. Among the pregnancy- and delivery-related factors, negative mood states and lack of support from husbands during pregnancy were related to postpartum physical symptoms. Among the relevant postpartum factors, poor-quality sleep was related to poor postpartum physical health. Breastfeeding also led to a poor perceived state of health, probably because the act of breastfeeding is tiring.

It should be noted that keeping all of the windows at home sealed, wearing long underwear and socks, avoiding hard or tough food, and not bending excessively at the waist or back resulted in a high performance scores and reflected the perceived risk of distress among women who faithfully followed these rules, but

Table 7
Factors associated with postpartum care performance and postpartum symptoms (coefficient of correlation).

		Average point of postpartum care performance	Self-evaluation point of health condition	Average point of the postpartum symptoms	BDI stage	BDI total points
Sociodemographic characteristics	Time of data collected	−0.264*	NA	NA	NA	NA
	Age	0.231*	NA	NA	NA	NA
	Parity	0.189*	NA	NA	NA	NA
	Smoking before pregnancy	NA	NA	0.229*	0.174*	0.226*
	Education state	0.024*	NA	NA	NA	NA
	Family income	NA	NA	NA	NA	NA
	Satisfaction with marriage	NA	NA	−0.198*	−0.178*	NA
	Satisfaction with parents-in-law	NA	NA	NA	−0.177*	NA
Characteristics related to the pregnancy	Planned pregnancy	NA	NA	NA	NA	NA
	Antenatal care	NA	NA	NA	NA	NA
	Employment during pregnancy	NA	NA	NA	NA	NA
	Education about pregnancy	0.016*	NA	NA	NA	NA
	Exercise during pregnancy	NA	NA	NA	NA	NA
	Weight gain after pregnancy	−0.210*	NA	NA	NA	NA
	Mood during pregnancy	NA	NA	−0.285*	−0.288*	−0.275*
	Satisfaction with husband's support	NA	NA	−0.289*	−0.327*	−0.350*
Characteristics related to the childbirth	Gestational age at delivery	NA	NA	NA	NA	NA
	Birthweight	NA	NA	NA	NA	NA
	Labor duration	NA	NA	NA	NA	NA
	Delivery method	NA	NA	NA	NA	NA
	Use of PCA during labor	NA	NA	NA	NA	NA
	Sex of newborn	NA	NA	NA	NA	NA
	Admission into NICU	NA	NA	NA	NA	NA
Characteristics related to puerperal life	Breast/bottle feeding	NA	−0.204*	NA	NA	NA
	Health food	NA	NA	NA	NA	NA
	Postpartum mood	0.206*	−0.306*	−0.383*	−0.446*	−0.437*
	Satisfaction with husband postpartum support	NA	−0.213*	−0.219*	−0.256*	−0.322*
	Amount of sleep	0.212*	NA	NA	NA	NA
	Quality of sleep	0.211*	−0.239*	−0.182*	−0.272*	−0.286*
	Household chores	0.248*	NA	NA	−0.177*	NA
	Return to work	−0.298*	NA	NA	NA	NA
	Outdoor activity	NA	NA	NA	NA	NA
	Exercise	−0.342*	NA	NA	NA	NA
Degree of knowledge on postpartum symptoms & postpartum care methods	Knowledge on postpartum symptoms	NA	NA	NA	NA	NA
	Need for postpartum care	NA	−0.164*	NA	NA	NA
	Knowledge on Korean-style postpartum care methods	NA	NA	NA	NA	NA
	Need for Korean-style postpartum care	NA	NA	NA	NA	NA

*p < 0.05.
BDI = Beck Depression Inventory; NA = not applicable; NICU = neonatal intensive care unit; PCA = patient controlled analgesia.

such behavior was not correlated with an improvement in physical symptoms. However, all traditional postpartum behaviors in Korea may not be based on superstition. Nevertheless, it is problematic that these behaviors are accepted as natural and reasonable and are considered essential to maintain and promote postpartum health.

There is much more research on postpartum mental state than on postpartum physical status. There are three main postpartum mental disorders: (1) "baby blues"; (2) postpartum depression; and (3) postpartum psychosis. Baby blues usually occur during the first 48 hours after delivery, and the mother recovers spontaneously within 72 hours. Postpartum depression has a worldwide prevalence of 10–15%, whereas postpartum psychosis, which has a prevalence of 0.1–0.2%, is characterized by a thought disorder and severe depression [14]. This study focused on postpartum depression to evaluate the overall postpartum mental state. The degree of depression was quantified using the BDI, which is an excellent screening tool that is used widely in research on depression, including postpartum depression [15]. Of our patients, 53.3% experienced depression, and 17.7% reported moderate to severe depression. Previous studies have reported that 10–15% women suffer from postpartum depression, although 25% are suspected of experiencing depression based on a commonly used screening tool

[10–14]. The higher prevalence in our study might be due to ethnic and socioeconomic differences in the patients.

Previous studies have reported that age, educational level, economic status, marital status, occupation, smoking history, family and social support, depression history, and social differences in perception are demographic factors affecting postpartum depression [14–17]. By contrast, in our study, only prepregnancy smoking was significantly correlated with postpartum depression. It is generally accepted that a difficult pregnancy and delivery and a baby with poor health places stress on mothers; however, this was not the case in our patients. It should be noted that husbands' support and women's mood during and after pregnancy were related to postpartum physical status. However, we could not identify the cause and the effect, although a previous study reported that good sleep and exercise relieved depression [12].

This study found a correlation between physical symptoms and depression. In the multivariate analysis, the factors related to the average score for postpartum symptoms were mood during the puerperium and total BDI score. In other words, the cause of postpartum symptoms may be psychological (e.g., somatization) rather than organic. Postpartum stress and the sense of loss can lead to physical discomfort, whereas postpartum changes in the endocrine system may affect mental health. Future systematic

Table 8
Correlation between postpartum care categories and presenting symptoms (coefficient of correlation).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hating coldness	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Having cold feelings	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.219*	NA	NA	NA	NA
Tingling sensation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arthralgia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.210*	NA	NA	NA	NA
Back pain	−0.188*	−0.234*	NA	NA	NA	NA	0.194*	NA	NA	−0.182*	−0.236*	NA	NA	NA	NA
Cervical pain	NA	NA	NA	NA	NA	NA	0.176*	NA	NA	−0.170*	−0.164*	NA	NA	NA	NA
Lumbar pain	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.174*	NA	NA	NA	NA	NA
Pelvic pain	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pain on the half of body	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.261*	NA	−0.185*
Generalized edema	NA	NA	NA	NA	−0.177*	NA	NA	NA	−0.204*	NA	−0.202*	NA	−0.218*	−0.166*	NA
Lower abdominal pain	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.229*	−0.193*	−0.300*	−0.168*	NA
Dysuria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Loss of appetite	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.210*
Indigestion	NA	NA	NA	NA	−0.164*	−0.192*	NA	−0.193*	−0.191*	NA	NA	NA	−0.272*	NA	−0.183*
Chest discomfort	NA	NA	−0.184*	NA	NA	NA	NA	NA	−0.171*	NA	NA	−0.185*	NA	NA	NA
Sweating a lot	NA	NA	NA	NA	NA	NA	0.181*	NA	NA	NA	−0.205*	NA	NA	NA	NA
Wound pain	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.169*	NA	NA	NA
Facial pain	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Headache	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.200*	−0.275*	NA
Breast pain	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.314*	NA	NA	NA	NA
Palpitation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.164*	NA	NA
Dyspnea	NA	NA	NA	NA	NA	−0.218*	NA	NA	NA	NA	NA	NA	−0.166*	NA	NA
Constipation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diarrhea	NA	NA	NA	−0.223*	NA	−0.244*	NA	NA	NA	NA	NA	NA	NA	NA	−0.276*
Hemorrhoid	NA	NA	NA	NA	NA	0.223*	NA	NA	NA	NA	NA	NA	0.171*	NA	0.179
Insomnia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.212*	NA	NA
Lethargy	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.195*
Self-evaluation point of health condition	NA	NA	NA	NA	−0.246*	−0.166*	NA	NA	NA	NA	−0.215*	NA	NA	NA	NA
Average point of the postpartum symptoms	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	−0.238*	NA	−0.216*	NA	NA

*$p < 0.05$.
1 = Keeping all windows sealed; 2 = heating up the floor; 3 = covering whole body with blanket; 4 = wearing long underwear and socks; 5 = ingesting a broad variety of food; 6 = avoiding cold things including water; 7 = avoiding hard or tough foods; 8 = not bending excessively at the waist or back; 9 = not lifting heavy things; 10 = avoiding to keep same standing or sitting position for a long time; 11 = treating the joints of hand with care when milking breasts; 12 = avoiding holding babies too long; 13 = avoiding squatting down; 14 = washing areas that need to be washed in short time without taking shower; 15 = gargling without a toothbrush; NA = not applicable.

pathophysiological research is needed to identify the cause of postpartum symptoms.

The study had several limitations. Firstly, it was longitudinal and used a self-administered screening test and questionnaire examining a small number of relevant factors. Another limitation is that recall bias might have affected the answers to the questions about prepregnancy or pregnancy, as the questionnaire was completed during the puerperium. Additionally, because this study used a cross-sectional design, it was impossible to identify the factors that were causative of postpartum symptoms and depression. Postpartum health might act as a dependent variable (i.e., as the result of the postpartum care), but it might also act as an independent variable given that good postpartum health may facilitate receiving good postpartum care.

Further prospective studies with more patients using standardized measures of natal physical conditions are required to examine these relationships. Studies should also examine the mother's condition more than 6 weeks after delivery. Additionally, pathophysiological research should determine whether the postpartum physical symptoms have an organic origin or whether they arise from psychological problems, such as somatization.

Despite these limitations, this study has several strengths. Firstly, it examined postpartum physical symptoms, which have not been investigated frequently. Secondly, unlike previous studies, this study excluded women who had problems before or during pregnancy or who experienced delivery-associated physical problems, examining only the effects of pregnancy and delivery on women's health. Thirdly, the multivariate analysis identified relevant factors associated with physical symptoms and depression and confirmed that physical and mental symptoms are closely related to each other.

In conclusion, women are weaker physically and mentally in the postpartum period as a consequence of reduced physical functioning, emotional imbalance, and the stress caused by childbirth and parenting. This study found that women complained of uncomfortable physical symptoms as long as 6 weeks after childbirth, which is defined as the end of the puerperium, and the majority of them also suffered from depression. Our findings show that better sleep during the puerperium may alleviate these symptoms. Furthermore, better support from husbands during and after pregnancy can ameliorate uncomfortable postpartum symptoms. Because postpartum depression and physical symptoms are closely related, an improvement in either one may contribute to the amelioration of the other.

Conflicts of interest

The authors have no conflicts of interest relevant to this article.

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