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博 士 論 文

The prevalence of the primary neck and shoulder pain, and its related factors in Japanese postpartum women

（日本人褥婦の本態性肩こりの有訴率と関連要因）

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The prevalence of primary neck and shoulder pain, and its related factors in Japanese postpartum women

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Summary

Purpose: This study was investigated the prevalence, location, and severity of Neck and shoulder pain (NSP), its disturbance of QOL, and what factors are related to NSP in Japanese postpartum women. *Materials and Methods*:The study involved 308 postpartum women who had a medical examination one month after delivery. The questionnaire consisted of the background and details of NSP. Mood states were evaluated using the Profile of Mood States-Brief (POMS-B) Japanese Version. *Results* : The prevalence of NSP was 73.1%, one-fourth of which occurred after birth. The most common area was the superior part of the trapezium muscles. Prevalence was associated with past history of premenstrual syndrome (PMS), anemia during pregnancy, time per breastfeeding and the mean POMS-B Fatigue score. Total breastfeeding time a day, the mean POMS-B score for Fatigue, Confusion, Anger-Hostility and Depression were significantly higher for "worse" after birth than those for "no-change/relief". The disturbance of daily life due to NSP in postpartum women with past history of PMS and Hiesho were significant higher than that for women without those. *Conclusions* : The prevalence of NSP in postpartum women was very high. The factors which affect NSP were the mental states, breastfeeding, past history of PMS, and anemia during pregnancy.

Key words: neck and shoulder pain; postpartum women; prevalence; breastfeeding

Introduction

Neck and shoulder pain is the most common symptom for Japanese women in a Japanese comprehensive survey of living conditions conducted by the Ministry of Health, Labour and Welfare in 2010 [1]. The prevalence of neck and shoulder pain in Japanese women in their thirties is 14.6%, which is double than that for men, and it rises with age. Neck and shoulder pain is often accompanied by a pain and an unpleasant symptom and the pain reduces quality of life (QOL) [2].

Neck and shoulder pain is classified into primary and secondary pain. Primary pain is defined as the absence of a definite disease, while secondary pain defined as the presence of a definite disease.

It has been demonstrated that primary neck and shoulder pain may be associated with multiple factors, including smoking, obesity[3], women, age[4,5], working conditions[4,6-8], and psychological distress such as depression or anxiety[9-13].

Postpartum women play many important roles in constantly and are in a physically and mentally stressful condition[14,15], which may be related to the prevalence or severity of neck and shoulder pain. However, there are no reports demonstrating what kind of factors affect the prevalence and severity of neck and shoulder pain, and its QOL disturbance in postpartum women.

Thus, we conducted the present study to examine the prevalence, location, and severity of neck and shoulder pain and its disturbance of QOL in Japanese postpartum women, and what kind of factors are related to neck and shoulder pain.

Materials and methods

Subjects

This study was conducted at two hospitals and one obstetric clinic in Kobe city, during October 2011 and April 2012.

Subjects were postpartum women with both term births and normal newborn babies. The women were excluded if they had an orthopedic disease.

Questionnaires were distributed to the postpartum women who consented to this study at their medical examination one month after delivery, and these were then deposited into a special box beside the reception desk (collection rate:83.7%).

This study was approved by the Ethical Committee at Kobe University Graduate School of Health Sciences.

Self-administered questionnaire

The questionnaire consisted of the subject's background and details of the neck and shoulder pain.

Background included age, height, weight, delivery history, delivery style, period after birth, anemia during pregnancy and after delivery, past history of premenstrual syndrome(PMS) and Hiesho, and method, position, frequency and duration of breastfeeding.

Neck and shoulder pain included the present history, onset (before and during pregnancy, after birth), Change of neck and shoulder pain after birth (five levels: worse, slightly worse, no change, a little relief, relief), areas for neck and shoulder pain, daily living activities which make the neck and shoulder pain worse, and disturbance of daily life due to neck and shoulder pain (level 0 (none) to10).

POMS-B (Profile of Mood States -Breief) Japanese version

Mood states were evaluated using the 30-item POMS-Brief Japanese version (POMS-B). POM-B is able to measure temporary change in feeling according to condition. The subject answered for each item her mood over the past one week.

The answer to each questions was described using a 5-point scale as not at all, a

little, moderately, quite a bit or extremely. A score of 0 to 4 was then assigned to each answer. POMS-B consists of the six mood state: "Tension-Anxiety"(T-A),"Depression" (D),"Anger—Hostility" (A-H), "Fatigue"(F),"Vigor"(V), and "Confusion"(C). The scores were the sums of the items for each mood state and these were calculated as a T-score. T-score = 50 + 10 ×(score-mean) / SD.

The scores of the above-mentioned items were compared between two groups: with neck and shoulder pain and without neck and shoulder pain, and worse after birth (worse, slightly worse) and no change/relief after birth (no change, a little relief, relief), for neck and shoulder pain, respectively.

Statistics

The differences in background, present neck and shoulder pain, and POMS-B score between the two groups were tested using the t -test and χ^2test. Statistical significance was expressed as p values at 95% confidence intervals.

All statistical analyses were carried out using SPSS for Windows（20J）.

Results

Characteristics of Subjects

Table1 shows the subject characteristics. The mean of age was 31.9±5.1 years （range 18—43）. The mean of BMI was 20.4±2.7 kg/m^2. The percentage of primipara and multipara were 48.1% （148/308) and 51.9% (160/308).

The rates of anemia during pregnancy and after birth were 47.4%(146/308) and 28.2% (87/308). Postpartum women with a past history of PMS were 20.5%(63/308) and those with a Hiesho were 64.6%(199/308). Concerning breastfeeding, breastfeeding only, breastfeeding and bottle-feeding, and bottle-feeding only were 76.9%(237/308), 20.8%(64/308), and 2.3% (7/308), respectively.

Neck and shoulder pain in postpartum women

1) Prevalence of neck and shoulder pain

A total of 225 individuals answered "yes" to the question "Do you presently have neck and shoulder pain?" The prevalence of neck and shoulder pain was 73.1% (225/308)

2) Present history of neck and shoulder pain (onset, change after birth)

Onset of neck and shoulder pain was categorized into four categories:before pregnancy, during pregnancy, after birth and others, and these were 66.2%(149/225), 4.0% (9/225), 24.9% (56/225) and 4.9% (11/225), respectively (Figure 1-A)). The mean of onset of neck and shoulder pain after birth was 8.1 ±5.9 days. Change of neck and shoulder pain after birth: "worse" and "slightly worse" were about 44.5%(100/225). "no change" was reported by 40.0% (90/225), " a little relief" by 12.4%(28/225) and "relief" by 3.1% (7/225) (Figure 1-B)).

3) The areas of neck and shoulder pain

The most common areas were the superior part of the trapezium muscles.

The strongest area was the left posterior cervical region 25.8% (58/225), and the next one was the left superior part of trapezium 25.3% (57/225). (Figure 2-B))

4) Daily living activities which make the neck and shoulder pain worse.

A total of 92.9% (209/225) of postpartum women with neck and shoulder pain reported that it became worse through daily living activities. The most frequently reported daily living activities were breastfeeding 69.3% (156/225), holding the baby 60.4% (136/225), and using a computer 37.8% (85/225).(multiple answer)(Figure 3).

Factors affecting neck and shoulder pain

1) Factors related to prevalence of neck and shoulder pain

The prevalence of neck and shoulder pain was associated with past history of PMS (P=0.000) and anemia during pregnancy (P=0.032). Hiesho, anemia after delivery,

smoking, age, delivery history, and delivery style did not appear to have a significant influence on neck and shoulder pain. There was a significant difference in the mean duration per breastfeeding(minutes) between the two groups (P=0.041). But method and position did not appear to have a significant influence on the prevalence of neck and shoulder pain.

Regarding the T-scores of POMS-B, the mean Fatigue (F) score for postpartum women with neck and shoulder pain was significantly higher than for those without neck and shoulder pain (P=0.003). The postpartum women with neck and shoulder pain showed higher scores in Tension-Anxiety (T-A), Depression (D), Anger-Hostility (A-H) and Confusion (C), and a lower score for Vigor (V), compared with those without neck and shoulder pain, but there were no significant differences (Table 2).

2) Factors related to change of neck and shoulder pain after birth

There were no significant differences in anemia during pregnancy, anemia after delivery, past history of PMS, Hiesho, and delivery style between the two groups. In regard to breastfeeding, total time per day was significantly longer in the "worse" group than the "no change/relief"group (P=0.018). The method, position, frequency per day, and breast tension did not appear to have a significant influence on causing the neck and pain to become worse after birth.

Regarding the T-scores of POMS-B, the mean score for D, A-H, F and C were significantly higher for "worse" than for "no-change/relief" of neck and shoulder pain (P=0.002, P=0.030, P=0.000 and P=0.023, respectively). This study showed that the T-A and V scores of postpartum women who perceived worse pain did not differ significantly from those who perceived no-change/relief after birth (Table 3) .

Disturbance of daily life due to neck and shoulder pain and its related factors

The mean score for postpartum women with neck and shoulder pain was 4.6±2.3

(Figure 4).

Table 4 shows the disturbance of daily life due to neck and shoulder pain, and its related factors. The mean scores for "worse" were significantly higher than for "no change/relief "after birth (P=0.001). There were significant differences in the mean scores for disturbance of daily life between Hiesho and past history of PMS (P=0.043, P=0.020).

Discussion

This is the first time to demonstrates that the prevalence of primary neck and shoulder pain in postpartum women was 73.1%, one-fourth of which was after birth-onset, and that the most common area is the superior part of the trapezium muscles, while the strongest area is the left posterior cervical region. The factors which affect neck and shoulder pain in postpartum women were mental states, breastfeeding, anemia during pregnancy and past history of PMS. Breastfeeding was the most common daily living activity that caused neck and shoulder pain tobecome worse.

Our research demonstrated that the prevalence of neck and shoulder pain in Japanese postpartum women was 73.1%. In Sweden, it was found to be 29.4% in 4-8weeks after childbirth[16]. Hill et al.[3] reported that 22.3% of participants who were over eighteen had pain, aching or stiffness in either shoulders. Hakala et al.[5] demonstrated that pain of the neck and shoulder affected 45% of girls in 18 years old. Therefore, the prevalence of neck and shoulder pain for Japanese postpartum women could be higher than that for postpartum women of other countries or those of other generations.

The most common areas for neck and shoulder pain in postpartum women in our study were the superior part of the trapezium muscles and the posterior region of the neck. This finding coincided with that for nurses reported by Iizuka[11]. However, the

rate of neck and shoulder pain in the posterior cervical region for postpartum women was higher than that for nurses. The muscle of the posterior cervical regions were extended by anteflexion posture during breastfeeding. This posture might cause neck and shoulder pain. Actually, the rate of after birth-onset neck and shoulder pain in postpartum women had a high prevalence in our study. Thus, it was suggested that breastfeeding might contribute to the increase in neck and shoulder pain after birth-onset.

Interestingly, neck and shoulder pain in postpartum women appeared outstandingly stronger on the left side compared with the right side. Fujii[17] reported that the strongest areas for neck and shoulder pain in employees were the right upper scapula 44.4% and the right neck 29.6%. It was noted that postpartum women put the head of the baby on the side oppsite their handedness (i.e. the left side for right handed women) for breastfeeding. It was therefore speculated that breastfeeding caused the higher rate for the left side neck and shoulder pain in postparutum women.

In our study, the mean POMS-B F score for postpartum women with neck and shoulder pain was significantly higher than that for those without neck and shoulder pain. The mean score for D, A-H, F and C were significantly higher for "worse" than that for "no-change/relief"after birth. Several research studies have reported that neck and shoulder pain is related to psychological factors such as depression[10,18], confusion[19], working stress and the extent of the feeling of satisfactions[8,13]. Psychological stress such as anxiety or depression in postpartum women may be more than that for others[20]. It was suggested that psychological states could affect the onset of neck and shoulder pain and cause it to worsen after birth in postpartum women.

In this study, more than 70% of postpartum women with neck and shoulder pain answered that breastfeeding made it worse in their daily life activities. In addition, breastfeeding was carried out nine times a day, taking 20 minutes each time, for a total

of 190 minutes a day. In particular, the required time per day for breastfeeding was related to the worsening of neck and shoulder pain after birth. Muscles around the neck and the shoulder girdle support the head and the arms, which weigh more than 4 kg, therefore there is always a load on the muscle around the shoulder girdle from the neck [21]. The posture of postpartum women tends to become unbalanced because of not-held head of the babies, and due to keeping the anteflexion posture for feeding. It seems likely that the after birth worsening of neck and shoulder pain after birth may be related to muscles strain, due to the posture adopted for breasfeedin and the length of time it takes.

There was significant difference in QOL level in the disturbance of daily life for "worse" and "no-change/relief" neck and shoulder pain in postpartum women. The number of involved sites of self-reported musculoskeletal pain was associated with the level of reduction in HRQOL among young adults[2]. Respondents with shoulder pain scored lower on all domains of the SF36[3]. Thus, neck and shoulder pain after birth led to the reduction in the level of QOL. The disturbance of daily life due to neck and shoulder pain in postpartum women with past history of PMS and Hiesho was significantly higher than those without those. PMS and Hieshou are health of obstacles related to the ovarians steroid hormones cyclist[22,23]. We speculated that the sudden hormone change after birth might contribute to the physiology of neck and shoulder pain.

Conclusions

This study demonstrated that the prevalence of neck and shoulder pain in post partum women was very high, and the rate of after birth- onset and worsening after birth were very high. In addition, neck and shoulder pain after birth led to a reduction in the level of QOL of postpartum women. It was revealed that neck and shoulder pain

greatly influenced the health of postpartum women. The factors which affect neck and shoulder pain were related to the mental states of postpartum women, time per breastfeeding, anemia during pregnancy, and past history of PMS. Breastfeeding in particular was idenrified by postpartum women as the daily living activity most responsible for causing their neck and shoulder pain to become worse. It was therefore suggested that this was an important factor.

Further studies should involve the collection and analysis of objective data to clarify how these factors influence the mechanism of neck and shoulder pain. It is also necessary to examine care for the prevention and improvement of neck and shoulder pain in postpartum women.

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Table1 Subject characteristics (n=308)

Background	Mean±SD or n(%)	Range
Age (yrs)	31.9±5.1	18-43
BMI (kg/m^2)	20.4±2.7	
Day after birth	35.5±7.3	17-58
Delivery history		
primipara	148(48.1)	
multipara	160(51.9)	
Delivery style		
vaginal delivery	254(82.5)	
caesarean section	65(17.5)	
Anemia during pregnancy	146(47.4)	
Anemia after birth	87(28.2)	
History of PMS	63(20.5)	
Hieshou	199(64.6)	
Breastfeeding method		
breastfeeding only	237(76.9)	
breastfeeding and bottle-feeding	64(20.8)	
bottle-feeding only	7(2.3)	

BMI (Body Mass Index), PMS (Premenstrual Syndrome)

Table 2 Present neck and shoulder pain (n=308)

	Mean±SD or n		
	yes(225)	no(83)	P
Age (yrs)	31.9 ±5.0	31.8 ±5.2	0.805
BMI (kg/cm^2)	20.4 ±2.6	20.61 ±3.0	0.504
Delivery history			
primipara	115	33	
multipara	110	50	0.077
Anemia during pregnancy			
yes	115	31	
no	110	52	0.032 *
Anemia after birth			
yes	69	18	
no	156	65	0.120
Delivery style			
vaginal delivery	183	71	
caesarean section	42	12	0.389
History of PMS			
yes	57	6	
no	168	77	0.000 **
Hiesho			
yes	151	48	
no	74	35	0.131
Smoking			
non-smoker	197	73	
current/ex-smoker	28	10	0.925
Breastfeeding method			
breastfeeding only	167	70	
breastfeeding and bottle-feeding / bottle-feeding only	58	13	0.061
Breastfeeding			
frequency (times/day)	9.6 ±2.1	9.6 ±2.3	0.968
one time (minutes)	20.9 ±10.5	18.2 ±7.9	0.041 *
total times a day (minutes)	198.5 ±106.0	176.6 ±93.5	0.113
POM-B			
T-A	44.4 ±8.7	42.8 ±8.3	0.146
D	44.7 ±7.2	44.2 ±6.8	0.645
A-H	48.4 ±8.9	47.7 ±9.8	0.564
V	44.7 ±9.7	46.7 ±9.4	0.094
F	47.8 ±7.8	44.8 ±8.3	0.003 **
C	43.1 ±7.9	43.2 ±8.1	0.919

*correlation is significant at the 0.05 level.**Correlation is significant at the 0.01 level

Table 3 Change of neck and shoulder pain after birth (n=225)

	Mean±SD or n		
	worse (100)	no-change/relief (125)	P
Age (yrs)	32.0 ±5.1	31.9 ±5.0	0.920
BMI (kg/cm^2)	20.1 ±2.4	20.5 ±2.8	0.504
Delivery history			
primipara	53	62	
multipara	47	63	0.612
Anemia during pregnancy			
yes	44	71	
no	56	54	0.056
Anemia after birth			
yes	35	34	
no	65	91	0.207
Delivery style			
vaginal delivery	87	96	
caesarean	13	29	0.051
History of PMS			
yes	29	28	
no	71	97	0.258
Hieshou			
yes	67	84	
no	33	41	0.975
Smoking			
non-smoker	87	110	
current/ex-smoker	13	15	0.821
Breastfeeding method			
breastfeeding only	71	96	
breastfeeding and bottle-feeding / bottle-feeding only	29	29	0.323
Breastfeeding			
frequency (times/day)	9.8 ±2.2	9.4 ±2.1	0.238
one time (minutes)	22.4 ±11.7	19.6 ±9.2	0.058
total times a day (minutes)	218.0 ±116.7	182.3 ±93.6	0.018 *
POMS-B			
T-A	44.7 ±9.6	44.1 ±8.0	0.585
D	45.9 ±8.9	43.6 ±5.4	0.023 **
A-H	49.9 ±10.0	47.2 ±7.8	0.030 **
V	44.3 ±9.6	44.9 ±9.8	0.567
F	49.9 ±8.5	46.2 ±6.8	0.000 **
C	45.0 ±9.3	41.5 ±6.1	0.002 **

*correlation is significant at the 0.05 level.**Correlation is significant at the 0.01 level

Table 4 Disturbance of daily life due to neck and shoulder pain (n=225)

	Mean±SD	P	
Change of neck and shoulder pain after birth			
worse	5.1 ±2.4		
no-change/relief	4.1 ±2.1	0.001	**
Hiesho			
yes	4.8 ±2.2		
no	4.1 ±2.4	0.043	*
History of PMS			
yes	5.2 ±2.2		
no	4.4 ±2.3	0.020	*

*correlation is significant at the 0.05 level.**Correlation is significant at the 0.01 level

Figure Legends

Figure1. Present history of neck and shoulder pain

A) Onset of neck and shoulder pain in postpartum women

B) Change in neck and shoulder pain after birth in postpartum women

Figure2. The areas for neck and shoulder pain

A) Distribution of areas for neck and shoulder pain

B) The strongest area for neck and shoulder pain

Figure3. Daily living activities that cause neck and shoulder pain to become worse

Figure4. Disturbance of daily life due to neck and shoulder pain in postpartum women

Figure1-A)

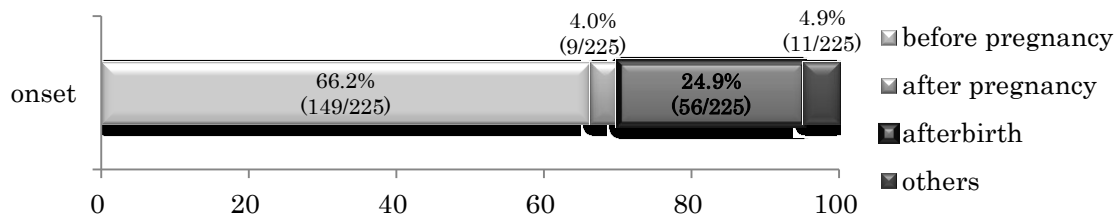

Figure1-B)

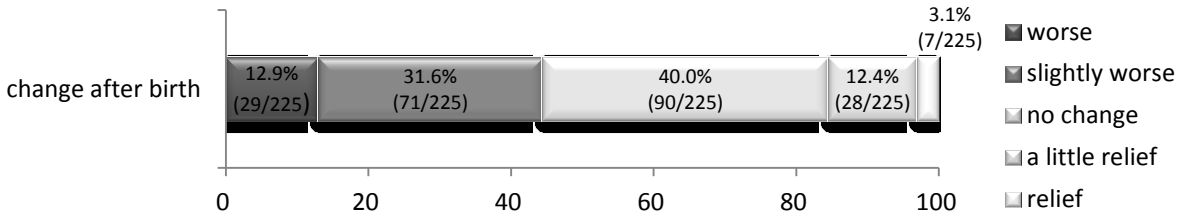

Figure 1. Present history of neck and shoulder pain

A) Onset of neck and shoulder pain in postpartum women

B) Change of neck and shoulder pain after birth in postpartum women

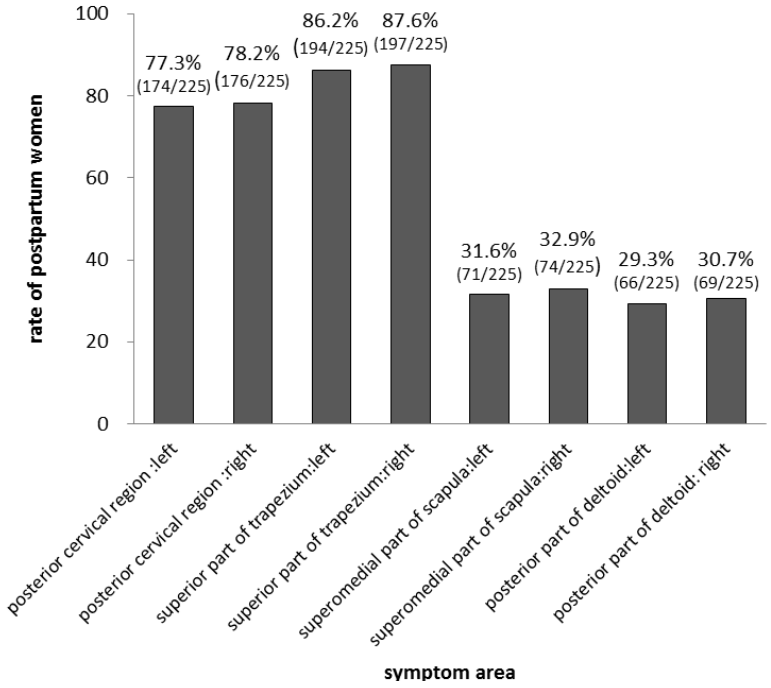

Figure2-A)

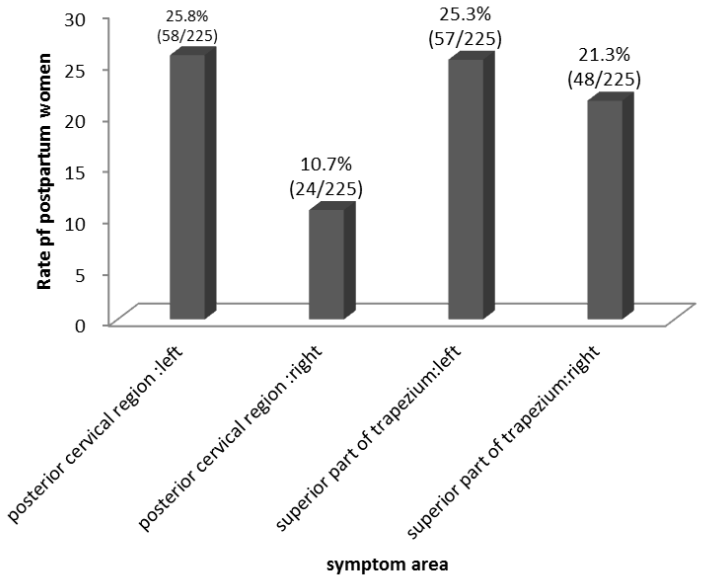

Figure2-B)

Figure2. The areas for neck and shoulder pain

A) Distribution of areas for neck and shoulder pain

B) The strongest area for neck and shoulder pain

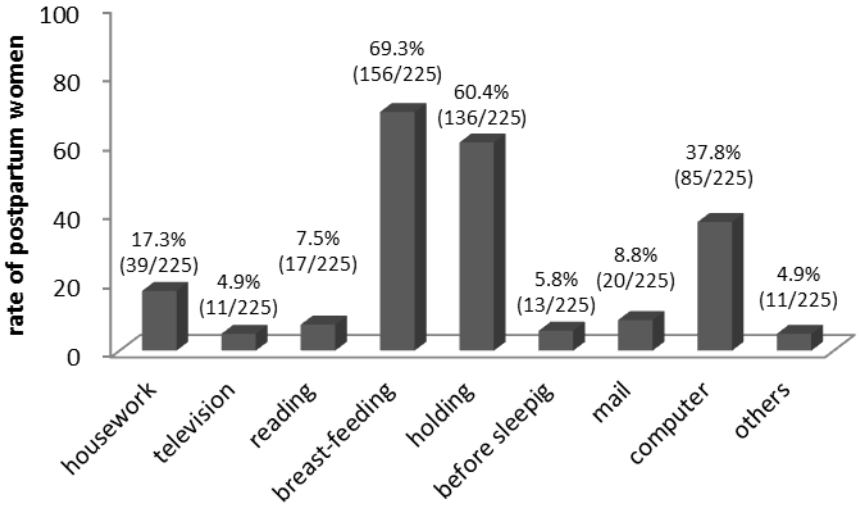

Figure 3. Daily living activities that cause neck and shoulder pain to become worse

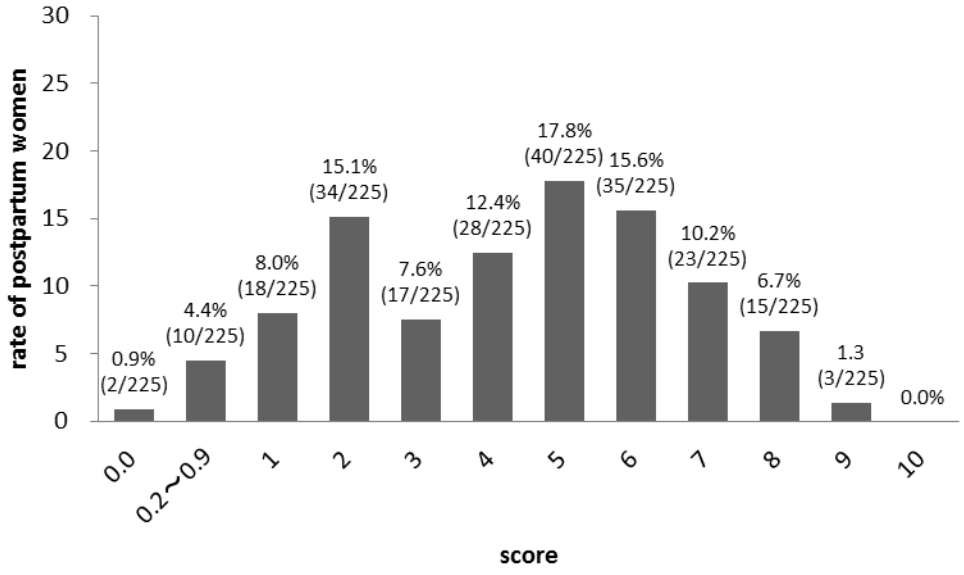

Figure 4. Disturbance of daily life due to neck and shoulder pain in postpartum women