ORIGINAL RESEARCH

Midwives' perception of the effects of footbaths for women in labor: A cross-sectional study

Naoko Hikita*[1,2], Kiyoko Mizuhata[2], Ritsuko Iso[2], Akemi Isoyama[2]

[1] *Department of Health Sciences, Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan*
[2] *Graduate Program of Midwifery, Dokkyo Medical University, Tochigi, Japan*

Received: August 8, 2022 **Accepted:** December 6, 2022 **Online Published:** December 22, 2022
DOI: 10.5430/jnep.v13n4p23 **URL:** https://doi.org/10.5430/jnep.v13n4p23

ABSTRACT

Footbaths are generally used for women in labor in clinical settings in Japan. However, it is unclear how their effects are perceived by midwives, or what effects they expect. Therefore, this study aimed to describe midwives' perception of footbaths' effects for women in labor. This cross-sectional study was conducted during January–March, 2022. Participants were midwives who worked at perinatal medical centers in the Kanto region. Self-administered questionnaires were used to collect data. A total of 364 midwives were asked to participate; of these, 291 (79.9%) responded to the questionnaires. The participants' mean age was 35.6 years old, and 120 (41.2%) had graduated from vocational schools. The average clinical experience was 12.1 years. Regarding the effects of footbaths, 274 (94.2%) participants selected "relaxes," whereas 166 (57.0%) selected "strengthens uterine contractions." These effects were related to educational attainment and the source of information about the effects of footbaths. Midwives' perception of footbaths' effects differed; thus, it is necessary to conduct studies which clarify the effects of footbaths in the future and to disseminate the results.

Key Words: Footbaths, Women in labor, Midwives, Perception

1. INTRODUCTION

Footbaths are generally used as complementary and alternative medicine in clinical settings to promote circulation, relieve pain, and enhance sleep quality and sleep onset.[1–5] Furthermore, footbaths may also increase the frequency of labor pains[6,7] and lengthen their duration.[6] Thus, footbaths are usually used to induce labor in clinical settings in Japan. Previous studies have reported that footbaths decreased the perception of lower back pain among pregnant women,[8] and had other mental health effects, such as lowering tension, anxiety, fatigue, and confusion.[9] Considering these effects, it is speculated that midwives use footbaths to promote labor, and because they expect them to have other effects.

The World Health Organization (WHO) has recommended using epidural analgesia for pain relief during labor.[10] In Japan, the frequency of epidurals for labor has increased in recent years.[11] However, because of a lack of obstetricians and anesthetists, and a consolidation of delivery facilities, some women are unable to use it during labor as desired. In Japan, several pain management measures during labor have been used by midwives, such as massage, warm packs, acupressure, immersion in hot water, and footbaths; thus, even if women do not have an epidural during labor, most are able to give birth with a satisfactory level of pain control. Though most pain management measures have evidence of pain relief during labor,[12,13] it is still unknown whether footbaths have the same effect.

Furthermore, it is not clear how midwives recognize the ef-

*Correspondence: Naoko Hikita; Email: nhikita-tky@umin.ac.jp; Address: Department of Health Sciences, Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan.

fects of footbaths, or what effects they expect when they use it. It is necessary to understand their perception of the effects of footbaths because it might affect their care for women in labor, thereby impacting the women's satisfactory experience of childbirth.

The aim of this study was to (1) examine midwives' perception of the effects of footbaths on women in labor, and (2) investigate the factors related to midwives' perception of the effects of footbaths.

2. METHOD

This cross-sectional study was conducted between January and March 2022. Participants comprised midwives who worked at perinatal medical centers in the Kanto region. Midwives who did not work at obstetric departments at the time of this survey were excluded.

2.1 Data collection

Before collecting data, the researchers posted letters to the directors of the nursing departments of all hospitals in the Kanto region to ask if they agreed to participate in this study. Those who agreed sent back the agreement form and disclosed the number of midwives working at their hospital. The researchers then sent each midwife an explanatory document, the self-administered questionnaire, a self-addressed envelope with a stamp for reply, and a small reward (a voucher) for participating in the study by post.

Information regarding the participants characteristics, such as age, education (vocational school, university, non-degree course for graduates, special university course, master's or doctoral degree), years of clinical and obstetrics experience, number of delivery assistance cases, experience in teaching students (yes or no), and experience of employing footbaths for women in labor (yes or no) were collected.

To measure midwives' perceptions regarding the effects of footbaths during the first stage of labor, they were asked to select from items such as "shortens the labor pain cycle," "lengthens the duration of labor pain," "strengthens uterine contractions," "relaxes," "refreshes," "encourages sleep onset," "relieves pain during childbirth," "cleans one's feet," "improves blood circulation in the lower limbs," "improves systemic blood circulation," "warms the lower body," and "warms the whole body." Moreover, the source of their information about the effects of footbaths was determined by selecting from items such as "in school," "from another midwife or colleague," and "from books or journals."

After completing the questionnaire, participants submitted it to the person in charge of their ward. The researchers requested that the person in charge not force the midwives to submit the questionnaire.

2.2 Statistical analysis

Descriptive statistics were used to analyze the participants' characteristics; categorical data were shown as n (%) and continuous variables were shown as mean $\pm$ SD. Multiple logistic regression analysis (forced entry method) was conducted to show the factors related to the midwives' perception of the effects of footbaths. Multicollinearity was evaluated using the Pearson product-moment correlation coefficient, Spearman's rank correlation coefficient, or Cramer's V; when the correlation coefficient was $\geq |0.7|$, one of the variables was removed from the multiple logistic regression analysis. All data were analyzed using IBM SPSS Statistics for Windows (version 25.0; IBM Corp., Armonk, NY, USA). Two-tailed p-values of $< .05$ were considered statistically significant.

2.3 Ethical considerations

This study was approved by the Research Ethics Committee of the School of Nursing, Dokkyo Medical University, Japan (No. Nursing 03020). Participation was voluntary, and participants who agreed to participate in this study provided consent. Participants' identifying information, such as name, home address, and date of birth, were not required. Participants were given a voucher as compensation for their participation.

3. RESULTS

3.1 Participants' characteristics

There were 96 hospitals with a perinatal medical center in the Kanto region. Of these, 19 (19.8%) agreed to participate in this study. A total of 364 questionnaires were sent to them, of which 291 (79.9%) were returned.

Table 1 shows the characteristics of the participants. The mean age was 35.6 $\pm$ 9.4 years old; 120 (41.2%) participants had graduated from vocational school, and 75 (25.8%) from university; the mean clinical experience was 12.1 $\pm$ 9.0 years, obstetrics experience was 10.6 $\pm$ 8.2 years; 161 (55.3%) participants had experience teaching students.

3.2 The effects of footbaths during the first stage of labor

Table 2 shows the effects of footbaths during the first stage of labor as per midwives' perception. For these effects, 274 (94.2%) selected "relaxes," 222 (76.3%) selected "improves systemic blood circulation," 207 (71.1%) selected "refreshes," 184 (63.2%) selected "warms the whole body," and 166 (57.0%) selected "strengthens uterine contractions," while 90 (30.9%) selected "shortens labor pain cycle," and 63 (21.6%) selected "lengthens the duration of labor pain."

Table 1. Characteristics of participants (n = 291)

	All (n = 291)			
	Mean ± SD or n (%)		Median	(Min, Max)
Age (years)*	35.6 ± 9.4		34.0	(23, 60)
< 29	102	(35.1)		
30 – 39	91	(31.3)		
40 – 49	67	(23.0)		
50 ≤	28	(9.6)		
Missing	3	(1.0)		
Educational attainment				
Vocational school	120	(41.2)		
University	75	(25.8)		
Non-degree course for graduates	47	(16.2)		
Special course of the university	16	(5.5)		
Master's course	29	(10.0)		
Doctoral course	1	(0.3)		
Missing	3	(1.0)		
Years of clinical experience†	12.1 ± 9.0		10.0	(1, 40)
Years of obstetrics experience	10.6 ± 8.2		9	(1, 36)
Number of delivery assistance cases	226.2 ± 293.2		122.5	(0, 2000)
Experience in teaching students				
Yes	161	(55.3)		
No	129	(44.4)		
Missing	1	(0.3)		
Experience of footbaths to women in labor				
Yes	276	(94.8)		
No	14	(4.8)		
Missing	1	(0.3)		

*: Missing for 3 participants. †: Missing for 2 participants.

Table 2. Effects of footbaths during the first stage of labor that midwives perceived

	Effective	
	n	(%)
Shortens the labor pain cycle	90	(30.9)
Lengthens the duration of labor pain	63	(21.6)
Strengthens uterine contractions	166	(57.0)
Relaxes	274	(94.2)
Refreshes	207	(71.1)
Encourages sleep onset	69	(23.7)
Relieves pain during childbirth	140	(48.1)
Cleans one's feet	45	(15.5)
Improves blood circulation in the lower limbs	173	(59.5)
Improves systemic blood circulation	222	(76.3)
Warms the lower body	120	(41.2)
Warms the whole body	184	(63.2)
Others	4	(1.4)

3.3 Factors related to the effects of footbaths during the first stage of labor

Table 3 shows the factors related to the effects of footbaths during the first stage of labor as perceived by the participants. The correlation coefficient for age and years of clinical and obstetrics experience exceeded |0.7|. Years of clinical and obstetrics experience, number of delivery assistance cases, and experience in teaching students had a correlation coefficient that exceeded |0.7|. Similar coefficients were found for the correlation between years of obstetrics experience, number of delivery assistance cases, and experience in teaching students; and number of delivery assistance cases and experience in teaching students. Thus, the variables of age and experience in teaching students were adopted as independent variables of multiple logistic regression analysis.

Participants who learned about the effects of footbaths in school and those who received information about footbaths from fellow midwives or colleagues significantly selected "shortened the labor pain cycle" (adjusted odds ratio [AOR] = 2.05, 95% confidence interval [CI]: 1.01 – 4.15; AOR = 1.87, 95% CI: 1.06 – 3.30, respectively). In contrast, participants who graduated from vocational schools, non-degree courses for graduates, special university courses, and graduate schools perceived that footbaths "strengthened uterine contractions" (AOR = 2.26, 95% CI: 1.07 – 4.81; AOR = 5.50, 95% CI: 1.45 – 20.83; AOR = 3.55, 95% CI: 1.39 – 9.07, respectively). Participants who learned about the effects of footbaths from books or journals significantly perceived footbaths as "refreshing" (AOR = 3.16, 95% CI: 1.47 – 6.81). Participants who learned about the effects of footbaths in school significantly perceived that footbaths "encouraged sleep onset" (AOR = 3.68, 95% CI: 1.62 – 8.36). Compared with participants who graduated from vocational schools, those who graduated from non-degree courses for graduates significantly perceived that footbaths "relieved pain during childbirth" (AOR = 3.29, 95% CI: 1.48 – 7.31). Moreover, participants who had experience teaching students, and those who learned about the effects of footbaths from books or journals significantly perceived that footbaths "relieved pain during childbirth" (AOR = 2.42, 95% CI: 1.23 – 4.76; AOR = 3.24, 95% CI: 1.72 – 6.11, respectively).

4. Discussion

This study is the first to investigate midwives' perceptions of the effects of footbaths during the first stage of labor. Nearly all the participants perceived footbaths to be "relaxing." These effects were related to educational attainment and the source of information about the effects of footbaths.

4.1 Participants' characteristics

The participation rate of the hospitals was only 19.8%, which was extremely low, and the response rate among eligible midwives was 79.9%. The low participation rate might be because of the ongoing coronavirus pandemic at the time of the survey; medical staff may have been too busy, or perhaps some staff might have been infected with the virus and therefore could not participate in the study.

Table 3. Factors related to the effects of footbaths during the first stage of labor that midwives perceived

	Shortens the labor pain cycle			**Lengthens the duration of labor pain**			**Strengthens uterine contractions**		
	AOR	**95% CI**	***p***	**AOR**	**95% CI**	***p***	**AOR**	**95% CI**	***p***
Age (years)	0.99	(0.95-1.03)	.622	0.99	(0.95-1.03)	.743	0.97	(0.94-1.01)	.104
Educarional attainment									
Vocational school	Reference				Reference		Reference		
University	1.32	(0.67-2.60)	.420	1.46	(0.67-3.16)	.338	1.51	(0.81-2.80)	.196
Non-degree course for graduates	2.11	(0.98-4.54)	.056	1.90	(0.79-4.53)	.150	**2.26**	**(1.07-4.81)**	**.034**
Special course of the university	1.00	(0.29-3.48)	.998	1.92	(0.54-6.84)	.317	**5.50**	**(1.45-20.83)**	**.012**
Graduate school	2.16	(0.92-5.10)	.079	2.46	(0.99-6.15)	.053	**3.55**	**(1.39-9.07)**	**.008**
Experience in teaching students									
Yes	1.12	(0.56-2.22)	.748	1.72	(0.80-3.70)	.167	1.88	(0.97-3.65)	.062
No	Reference			Reference			Reference		
Source of information about the effects of footbaths									
At school class*	**2.05**	**(1.01-4.15)**	**.046**	1.18	(0.57-2.45)	.656	1.25	(0.65-2.41)	.509
From midwife/colleague*	**1.87**	**(1.06-3.30)**	**.030**	1.70	(0.91-3.17)	.097	1.23	(0.72-2.12)	.451
From books/Journal*	1.17	(0.63-2.19)	.620	1.62	(0.84-3.11)	.151	1.44	(0.78-2.67)	.244
	Relaxes			**Refreshes**			**Encourages sleep onset**		
	AOR	**95% CI**	***p***	**AOR**	**95% CI**	***p***	**AOR**	**95% CI**	***p***
Age (years)	0.98	(0.91-1.06)	.690	1.05	(1.01-1.10)	.021	1.04	(1.00-1.08)	.063
Educarional attainment									
Vocational school	Reference			Reference			Reference		
University	1.22	(0.28-5.26)	.794	1.20	(0.60-2.39)	.610	1.12	(0.54-2.34)	.766
Non-degree course for graduates	0.79	0.18-3.42)	.748	0.84	(0.38-1.88)	.670	0.86	(0.35-2.13)	.750
Special course of the university	0.98	(0.11-9.21)	.989	0.65	(0.20-2.14)	.476	0.69	(0.17-2.77)	.605
Graduate school	1.73	(0.20-15.08)	.621	0.93	(0.36-2.41)	.883	0.88	(0.33-2.33)	.790
Experience in teaching students									
Yes	1.02	(0.24-4.30)	.982	0.51	(0.25-1.05)	.066	1.23	(0.57-2.65)	.590
No	Reference			Reference			Reference		
Source of information about the effects of footbaths									
At school class*	1.19	(0.29-5.01)	.808	1.66	(0.79-3.50)	.180	**3.68**	**(1.62-8.36)**	**.002**
From midwife/colleague*	1.97	(0.59-6.55)	.268	1.11	(0.60-2.04)	.749	1.59	(0.87-2.92)	.132
From books/Journal*	0.66	(0.19-2.27)	.511	**3.16**	**(1.47-6.81)**	**.003**	1.84	(0.94-3.56)	.073
	Relieves pain during childbirth			**Cleans one's feet**			**Improves blood circulation in the lower limbs**		
	AOR	**95% CI**	***p***	**AOR**	**95% CI**	***p***	**AOR**	**95% CI**	***p***
Age (years)	0.98	(0.94-1.02)	.252	1.03	(0.98-1.08)	.323	1.00	(0.97-1.04)	.892
Educarional attainment									
Vocational school	Reference			Reference			Reference		
University	1.35	(0.72-2.57)	.353	1.62	(0.69-3.77)	.266	**2.45**	**(1.27-4.75)**	**.008**
Non-degree course for graduates	**3.29**	**(1.48-7.31)**	**.003**	2.05	(0.81-5.19)	.131	1.61	(0.76-3.41)	.210
Special course of the university	0.41	(0.12-1.46)	.169	1.39	(0.34-5.69)	.644	0.99	(0.34-2.93)	.990
Graduate school	1.26	(0.53-2.96)	.601	0.47	(0.10-2.21)	.339	0.72	(0.32-1.63)	.426
Experience in teaching students									
Yes	**2.42**	**(1.23-4.76)**	**.010**	0.86	(0.36-2.09)	.743	0.77	(0.40-1.48)	.428
No	Reference			Reference			Reference		
Source of information about the effects of footbaths									
At school class*	0.87	(0.44-1.70)	.679	1.56	(0.60-4.03)	.361	1.21	(0.63-2.33)	.567
From midwife/colleague*	0.63	(0.36-1.10)	.101	0.67	(0.32-1.38)	.274	1.21	(0.70-2.08)	.492
From books/Journal*	**3.24**	**(1.72-6.11)**	**< .001**	1.30	(0.59-2.88)	.514	1.48	(0.81-2.72)	.205
	Improves systemic blood circulation			**Warms the lower body**			**Warms the whole body**		
	AOR	**95% CI**	***p***	**AOR**	**95% CI**	***p***	**AOR**	**95% CI**	***p***
Age (years)	1.01	(0.97-1.05)	.739	1.01	(0.97-1.04)	.767	0.98	(0.95-1.02)	.399
Educarional attainment									
Vocational school	Reference			Reference			Reference		
University	1.60	(0.77-3.32)	.207	**1.97**	**(1.05-3.68)**	**.034**	1.21	(0.63-2.32)	.577
Non-degree course for graduates	1.63	(0.68-3.90)	.270	0.63	(0.29-1.39)	.253	0.84	(0.40-1.77)	.645
Special course of the university	1.74	(0.45-6.74)	.421	1.08	(0.36-3.26)	.891	**0.32**	**(0.11-0.97)**	**.044**
Graduate school	2.52	(0.81-7.90)	.112	0.79	(0.33-1.87)	.591	0.81	(0.34-1.90)	.625
Experience in teaching students									
Yes	0.94	(0.44-1.99)	.861	0.74	(0.38-1.42)	.357	1.47	(0.75-2.85)	.259
No	Reference			Reference			Reference		
Source of information about the effects of footbaths									
At school class*	**2.38**	**(1.10-5.14)**	**.027**	1.12	(0.59-2.12)	.737	1.35	(0.69-2.63)	.385
From midwife/colleague*	**1.97**	**(1.02-3.81)**	**.045**	1.69	(0.99-2.88)	.055	1.37	(0.79-2.37)	.269
From books/Journal*	1.28	(0.62-2.64)	.497	**1.95**	**(1.08-3.52)**	**.027**	1.57	(0.84-2.94)	.155

Note. Multiple logistic regression analysis adjusted for the variables in this table. AOR: Adjusted odds ratio; CI: Confidence interval; *: Yes = 1, No = 0

According to the Japanese Nursing Association data,[14] 40,632 midwives were employed in Japan in 2019; of these, 9,184 midwives worked at hospitals in the Kanto region.[15] Since our target was midwives who work at perinatal medical centers in the Kanto region, the potential number of eligible midwives was even lower. Despite that, we could only cover less than 20% of the hospitals; thus, the generalizability of the findings is limited and the results should be interpreted with caution.

4.2 The effects of footbaths during the first stage of labor

In this study, most participants perceived footbaths as "relaxing," and more than 70% of the participants thought footbaths "improve systemic blood circulation" and "refresh." These effects have been reported in several previous studies, though the target subjects were not women in labor.[16–18] Furthermore, these effects were taught to nursing students as part of fundamental nursing skills;[19] thus, most of the participants believed these to be the effects of footbaths.

Further, less than one-third of the midwives thought that footbaths "shortened the labor pain cycle" and "lengthened the duration of labor pain." Though these effects have been reported in previous studies,[6,7] they were not widely known, possibly because the evidence levels of those studied were low, the study design was not a randomized control trial,[6] or the sample size was small. Additionally, the studies were reported in local academic journals; therefore, only a limited number of people might have had access to them.

4.3 Factors related to the effects of footbaths during the first stage of labor

Participants who learned about the effects of footbaths in school and those who got information about footbaths from a fellow midwife or colleague significantly perceived footbaths to "shorten the labor pain cycle." During practicum, footbaths are often used as midwifery care, and students may have learned that footbaths were effective for labor. Interestingly, "lengthens the duration of labor pain" as an effect of footbaths was not related to these participants' perception.

Compared to participants who graduated from vocational school, those who graduated from non-degree courses for graduates, special university courses, and graduate schools thought footbaths "strengthened uterine contractions." This effect was reported by a previous study,[6] though the labor pain score was compared only before and after footbaths. Generally speaking, labor pain gets stronger over time; thus, a study cannot be taken as conclusive that footbaths increase the strength of uterine contractions unless they compare an experimental group with a control group. In light of that, no study has yet demonstrated that "strengthening uterine contractions" is an effect of footbaths. Why midwives who graduated from non-degree courses for graduates, special university courses, and graduate schools had this perception was not clear.

Compared with participants who graduated from vocational schools, those who graduated from non-degree courses for graduates, had experience in teaching students, and who learned the effects of footbaths from books or journals significantly thought that footbaths could "relieve pain during childbirth." Some literature has reported this effect during the first stage of labor,[20,21] possibly because midwives who had experience of teaching students studied the effects of footbaths by reading books or journals. In addition, the relaxing effects of footbaths have been reported in several studies,[22] and some midwives might think that relaxation is the same as pain relief during childbirth. However, though some books or journals mention the pain relief effects, the evidence level is very low.

Participants who learned about the effects of footbaths in school significantly thought that footbaths "encouraged sleep onset." While several studies have reported that footbaths are effective in promoting sleep onset or improving sleep quality for older adults as complementary and alternative medicine,[1,3–5,23] other studies did not demonstrate this effect.[24,25] In Japan, one nursing study[19] describes footbaths as encouraging sleep onset; thus, participants who learned the effects of footbaths in school might think that footbaths had this effect.

4.4 Limitations

This study has several limitations. First, the response rate was very low; only 19.8% of the facilities approached agreed to participate. Second, we only targeted midwives working at perinatal medical centers in the Kanto region; thus, the results of this study might not reflect the real situation of midwives in Japan.

Despite its limitations, this study has several strengths. It is the first to reveal midwives' perception of the effects of footbaths during the first stage of labor. Though footbaths are frequently used in clinical settings as part of care provided by midwives, how they perceive the effects of footbaths has to date been unknown. This study provides useful data regarding how midwives perceive the effects of footbaths, and opens doors for further research on midwifery education.

5. CONCLUSION

This study investigated the effects of footbaths during the first stage of labor as perceived by midwives. These effects

were primarily related to educational level and the source of information about the effects of footbaths. The participants differed in how they perceived the effects of footbaths; thus, it is necessary to conduct studies which clarify these effects in the future and to disseminate the results.

ACKNOWLEDGEMENTS

We would like to extend our gratitude to all the midwives who participated in this study.

CONFLICTS OF INTEREST DISCLOSURE

No conflict of interest has been declared by the authors.

REFERENCES

[1] Aghamohammadi V, Salmani R, Ivanbagha R, et al. Footbath as a safe, simple, and non-pharmacological method to improve sleep quality of menopausal women. Res Nurs Health. 2020; 43(6): 621-628. PMid:33112004 https://doi.org/10.1002/nur.22082

[2] Nakagawa Y, Shinoda Y, Matsubara C, et al. Sanjoku-ki no kashi no fushu ni taisuru sokuyoku no kouka. Annual of Gifu Prefectural Gero Hot Spring Hospital. 2010; 35: 7-12 (In Japanese)

[3] Seyyedrasooli A, Valizadeh L, Zamanzadeh V, et al. The effect of footbath on sleep quality of the elderly: a blinded randomized clinical trial. J Caring Sci. 2013; 2(4): 305-311.

[4] Sung EJ, Tochihara Y. Effects of Bathing and Hot Footbath on Sleep in Winter. J Physiol Anthropol Appl Human Sci. 2000; 19(1): 21-27. PMid:10979246 https://doi.org/10.2114/jpa.19.21

[5] Valizadeh L, Seyyedrasooli A, Zamanazadeh V, et al. Comparing the Effects of Reflexology and Footbath on Sleep Quality in the Elderly: A Controlled Clinical Trial. Iran Red Crescent Med J. 2015; 17(11): e20111. https://doi.org/10.5812/ircmj.20111

[6] Miyazato K. Effects of footbath on physiological and psychological aspects in the first stage of labor. Journal of St. Luke's Society for Nursing Research. 2000; 4(1): 21-29. (In Japanese)

[7] Sakamoto S, Kawada N, Mori M, et al. Sokuyoku ga bunben dai 1-ki no bijaku jintsu ni oyobosu eikyo. Kumamoto Journal of Maternal Health. 2016; 19: 5-10. (In Japanese)

[8] Momoi M. Evaluation research on the use of the foot bath for pregnant women experiencing low back pain. J. Jpn. Acad. Nurs. Sci. 1999; 19(1); 31-41. (In Japanese) https://doi.org/10.5630/jans1981.19.1_31

[9] Tokutake C, Sakaguchi K, Haga A, et al. The effect of foot bath on the autonomic nervous function and status of psychological pregnant women. Nagano Journal of Maternal and Child Health. 2014; 16; 31-39. (In Japanese)

[10] World Health Organization. WHO recommendations: intrapartum care for a positive childbirth experience. 2018. Available from: https://www.who.int/publications/i/item/9789241550215

[11] Unno N, Ishiwata I, Itakura A. Heisei 29-nendo Kouseiroudou gyousei suishin tyosa jigyohi hojokin (Kouseiroudou tokubetsu kenkyu jigyo), "Mutsu bunben no jittai haaku oyobi anzen kanri taisei no kouchiku ni tsuite no kenkyu", Kentou kadai (1) Houkokusyo "Bunben ni kansuru tyosa oyobi niji tyosa no kekka to sono bunseki". Available from: https://www.jalasite.org/doc/wp-content/uploads/2018/12/3.-%E7%84%A1%E7%97%9B%E5%88%86%E5%A8%A9%E7%A0%94%E7%A9%B6%E5%A0%B1%E5%91%8A%E6%9B%B8-%E5%AE%9F%E6%85%8B%E8%AA%BF%E6%9F%BB%E3%80%80%E4%BF%AE%E6%AD%A3%E7%89%88.pdf(InJapanese)

[12] Cluett ER, Burns E. Immersion in water in labour and birth. Cochrane Database of Systematic Reviews. 2009; Issue 2.

[13] Smith CA, Levett KM, Collins CT, et al. Massage, reflexology and other manual methods for pain management in labour. Cochrane Database Syst Rev. 2018; 3(3): CD009290. PMid:29589380 https://doi.org/10.1002/14651858.CD009290.pub3

[14] Japanese Nursing Association. Kango toukei siryousitsu. 2020a. Available from: https://www.nurse.or.jp/home/statistics/pdf/toukei03.pdf (In Japanese)

[15] Japanese Nursing Association. Kango toukei siryousitsu. 2020b. Available from: https://www.nurse.or.jp/home/statistics/pdf/toukei06.pdf (In Japanese)

[16] Ithou K, Saeki K, Numano M, et al. Reaction of the body to a foot bath without and with the essential oil of lavender. Structure and Function. 2009; 7(2): 59-66. (In Japanese)

[17] Iwazaki M, Nomura S. Examination of the Relaxing Effects of the Local Warm Pack Application-Comparison of the Influences of Two Treatments: Warm Pack Application to the Back and Warm Foot Soaks. Journal of Japan Society of Nursing Research. 2005; 28(1): 33-43. https://doi.org/10.15065/jjsnr.20041018001 (In Japanese)

[18] Lee JH, Seo EK, Shim JS, et al. The effects of aroma massage and foot bath on psychophysiological response in stroke patients. J Phys Ther Sci. 2017; 29(8): 1292-1296. PMid:28878450 https://doi.org/10.1589/jpts.29.1292

[19] Yoshinaga A, Yoshimoto T. Factors affecting the domestic development of hot footbaths as a nursing technique for the relief of headaches to the facilitation of sleep in Japan. Japanese Journal of Nursing Art and Science. 2007; 6(1): 70-77. (In Japanese)

[20] Hirose T. Samazama na santsuu kanwa hou. Perinatal Care. 2016; 35(2): 156-61. (In Japanese)

[21] Takeda A, Mizumoto A, Hunaki T, et al. Effect of foot bathing on progress during the first stage of labor. Aichi Journal of Maternal Health. 2007; 25: 55-59. (In Japanese)

[22] Okita S, Yamanaka R. Review on the Relaxation Effects of Foot Baths. Bulletin of School of Nursing Kyoto Prefectural University of Medicine. 2018; 28: 55-60. (In Japanese)

[23] Kim HJ, Lee Y, Sohng KY. The effects of footbath on sleep among the older adults in nursing home: A quasi-experimental study. Complement Ther Med. 2016; 26: 40-6. PMid:27261980 https://doi.org/10.1016/j.ctim.2016.02.005

[24] Liao WC, Chiu MJ, Landis CA. A warm footbath before bedtime and sleep in older Taiwanese with sleep disturbance. Res Nurs Health. 2008; 31(5): 514-528. PMid:18459154 https://doi.org/10.1002/nur.20283

[25] Liao WC, Wang L, Kuo CP, et al. Effect of a warm footbath before bedtime on body temperature and sleep in older adults with good and poor sleep: an experimental crossover trial. Int J Nurs Stud. 2013; 50(12): 1607-1616. PMid:23669188 https://doi.org/10.1016/j.ijnurstu.2013.04.006