

Practice of Physiotherapeutic Care by Midwives: A Longitudinal Study before and after the Introduction of a Physical Therapy Training Program

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Abstract

Aim: To evaluate changes in midwives' practice before and after the introduction of brief physiotherapeutic training sessions during pregnancy and the postpartum period, over a one-year period. **Methods:** This research design is a longitudinal study. We held a study session to introduce a simplified version of the midwife physical therapy training program, and then held additional lectures to strengthen the practice after 8 months. Immediately before the first study session, and three months, six months, and one year later, a self-administered questionnaire was used to gauge midwifery care practices, knowledge, and interest related to the physiotherapeutic perspective and confidence in practice. The methods used for measurement were ANOVA, the Wilcoxon signed-rank test, and the Pearson product-moment correlation coefficient. **Results:** Practice of midwifery care related to physiotherapeutic perspective increased gradually after the study session compared to before the session. There was a significant difference in practice after one year compared to before the session. Knowledge increased significantly at all time points after the study session compared to before. Interest was highest before the session and did not differ significantly after the session. Confidence to practice teaching increased significantly after one year, with significant positive correlations found between practice and knowledge at all time points after the study session, and between practice and confidence in teaching one year later. **Conclusions:** Within a year after introducing study sessions, changes in midwives' practices were confirmed. The study suggested that acquiring knowledge and confidence in physical therapy training are related to midwives' practices. **Trial registration:** UMIN 000044921. Registered 20 July 2021,

https://center6.umin.ac.jp/cgi-open-bin/ctr_e/ctr_view.cgi?recptno=R000051312.

Keywords

Confidence, Knowledge, Midwifery, Physiotherapeutic, Practice

1. Introduction

Before and after childbirth, many women experience urinary incontinence owing to strain on the pelvic floor muscle groups and hypermobility of the bladder neck [1] [2]. Pelvic floor muscle training (PFMT) is commonly recommended for the prevention and treatment of urinary incontinence during pregnancy and postpartum [3]. In the skeletal muscular system, the lumbar spine and pelvic region are under great strain owing to a shift in the center of gravity as the joints relax and the abdomen increases due to the action of Relaxin during pregnancy [4]. Pregnancy-related pelvic girdle pain affects approximately half of all pregnant women, causes severe pain in 25%, persists for a long time after delivery in 10%, and has a negative impact on women's health [5]-[8]. Such pain also has a psychological impact, negatively affecting a woman's identity, her desire to raise children, and her daily life, both at home and at work [9]. There is clear evidence illustrating the effectiveness of physical therapy in women's health for a variety of symptoms, including urinary incontinence, pelvic girdle pain, and diastasis recti abdominal, frequently seen in pregnant and postpartum women [10] [11].

Prior to this study, interviews were conducted in Japan to determine what physical symptoms postpartum women suffered from and their subsequent needs [12]. The most common symptoms during pregnancy were back pain and urine leakage; back pain, stiff shoulders, and wrist and hand pain were frequently reported after childbirth. This indicates that women during pregnancy and after childbirth need to take measures to prevent urine leakage and learn about postures and daily activities that do not strain the body, and that all of the participants interviewed wanted midwife guidance in these areas. Currently, little is being done to incorporate a physiotherapeutic perspective for prenatal and postpartum women. The barriers are lack of education and lack of opportunities for care providers, which is a personal and organizational implementation challenge [13] [14]. Therefore, it is necessary to introduce midwifery care related to a physiotherapeutic perspective by learning about good posture suitable for prenatal and postpartum women from physical therapists, as well as how to deal with back pain and urine leakage, to enhance the practical skills of midwifery during prenatal and postpartum periods. The physiotherapeutic perspective refers to the viewpoint of physical therapists who assess physical functions and aim to maintain or enhance them.

The purpose of this study is to evaluate changes in midwives' practice over a one-year period before and after the introduction of brief physiotherapeutic training sessions during pregnancy and the postpartum care.

2. Methods

2.1. Study Design

This was a longitudinal study with a single group of midwives and a pre- and post-intervention design.

2.2. Participants

The study participants were midwives working at a primary facility, namely an obstetric clinic in Tokyo, Japan. Exclusion criteria were administrators who did not practice midwifery.

2.3. Settings

The facility that collaborated on this study was an obstetrics clinic located in a residential area away from the center of Tokyo that primarily provided natural childbirth services to low-risk pregnant women. This facility was selected because midwives are able to practice maternal care independently.

2.4. Study Procedures

A study session on developing a physiotherapeutic perspective was held in August 2021. An additional lecture on strengthening practice was held eight months later. The same questionnaire was used to gauge repeated measures immediately before the first study session and at three months, six months, and one year after the study session.

2.4.1. A Study Session to Develop a Physiotherapeutic Perspective

The “Study Session to Develop a Physiotherapeutic Perspective” was developed by the researcher, two physiotherapists and two midwives after careful selection and discussion of the content. The content consisted of two parts: a video created by the physiotherapists and a face-to-face session with the physiotherapists. The video was approximately 10 min long and included basic knowledge content, such as changes in the body due to pregnancy, function of the inner unit, and function of the pelvic floor muscles.

Face-to-face training included practical skills regarding how to teach pelvic floor muscle training (PFMT), good posture (GP), and daily activities (DA). In the PFM teaching method, participants played the role of each other as patients and practiced verbal explanation, breathing instruction, transabdominal ultrasound, abdominal muscle check, and tailbone palpation. Vaginal palpation was explained only using a textbook and was not practiced. For GP and DA, the following were practiced: checking for good or bad posture, checking for physical pain, caution in getting up and standing up, and instruction for posture when feeding and when taking care of the baby.

2.4.2. Additional Lecture to Strengthen Practice

The additional lecture to strengthen practice included a review of practical skills, focusing on questions that arose after the study participants had practiced the techniques.

2.5. Data Collection

To analyze changes over time at four time points, from before to one year after the study session, the study participants' questionnaires were numbered so that they could be linked. Questionnaires were brought by the researcher at each time point and collected in a collection box in the staff lounge. The first questionnaire asked about years of experience as a midwife and sources of knowledge about how to teach PFMT and GP&DA, and each questionnaire asked about knowledge, interest, confidence, and practice, as well as specifics of practice.

2.6. Study Outcomes

The primary outcome was the change in practice of midwifery care related to a physiotherapeutic perspective after at three months, six months, and one year. Practices related to the physiotherapeutic perspective in this study were defined as instruction on PFMT and GP and DA.

2.6.1. Practice

The participants self-gauged their level of practice related to the physiotherapeutic perspective on a scale ranging from 0 (none) to 10 (very high). Immediately before and after at three months, six months, and one year after the study session, we asked questions about specific practices related to the physiotherapeutic perspective.

2.6.2. Knowledge

The participants plotted their level of knowledge related to their physiotherapeutic perspective on a scale ranging 0 (none) to 10 (very high).

2.6.3. Interest

The study participants plotted their level of interest related to their physiotherapeutic perspective on a scale ranging from 0 (none) to 10 (very high).

2.6.4. Confidence

Midwives self-rated their confidence in teaching PFMT, GP, and DA to expectant mothers on a 5-point scale from "very confident" to "5," "a little confident" to "4," "not very confident" to "3," "not confident" to "2," and "unsure" to "1."

2.7. Statistical Analysis

Statistical analyses were performed using SPSS Statistics, version 28.0 for Windows (IBM Inc., Armonk, NY, USA). After information related to descriptive statistics was calculated, practice, knowledge, interest, at four time points (pre-study, three months, six months, and one year) were made using one-way analysis of variance (ANOVA).

Confidence in teaching PFMT and GP and DA, as well as changes in specific practices, were tested via Wilcoxon signed-rank tests at three months, six months and one year post-session. The correlation between practice and knowledge, practice and interest, practice and confidence in teaching PFMT, and practice and confidence in teaching GP and DA at three time points (three months, six months,

and one year) were calculated using Pearson's product-moment correlation coefficient.

ANOVA and nonparametric tests were performed according to the normal distribution. The missing data from participants lost to follow-up were not included in the analysis. In this study, a level of $p < 0.05$ was employed to indicate statistical significance.

2.8. Ethical Considerations

The study was approved by the Research Ethics Review Committee of Teikyo University, Tokyo, Japan (No.21-070), and was registered with the Clinical Trials Registry (Registration No. UMIN 000044921).

3. Results

A total of 18 midwives agreed to join the project and participate in the study sessions; 12 midwives who responded at all four time points (three months, six months, and one year) were included in the analysis.

3.1. Participants' Attributes

The results regarding participants' attributes are presented in **Table 1**. The mean duration of the participants' midwifery experience was 14 years and 7 months.

Prior to the study session, most participants (58.3%) were a little familiar with PFMT instructional methods while an equal proportion were a little familiar (50%) or not very familiar (50%) with GP and DA instructional methods.

Table 1. Participant's attributes (N = 12).

Attributes	Mean	SD
Age (years)	42.4	8.9
Midwifery experience (years)	14.7	7.2
	n	%
How to teach PFMT		
Familiar	1	8.3
A little familiar	7	58.3
Not very familiar	3	25.0
Not familiar	1	8.3
How to teach GP & DA		
Familiar	0	0.0
A little familiar	6	50.0
Not very familiar	6	50.0
Not familiar	0	0.0

Abbreviations: PFMT, Pelvic Floor Muscle Training; GP & DA, Good Posture and Daily Activities.

In terms of the source of their knowledge, many participants cited knowledge from lectures and textbooks from their student days.

3.2. Changes in Practice, Knowledge, and Interest before and after the Study Session

Table 2 shows changes in midwifery practice and changes in knowledge and interest related to the physiotherapeutic perspective.

3.2.1. Practice Level Using the Scale

Practice using the scale increased with the passage of time from the study session to three months, six months, and one year after the study session, compared to before the study session. A one-way ANOVA was performed to compare the effect of time on practice.

There was a statistically significant difference in knowledge between the four time points.

Bonferroni test for multiple comparisons found that the mean value of practice was significantly higher between year one and pre-session ($p < 0.001$).

3.2.2. Knowledge and Interest Levels Using the Scale

Knowledge increased after three months compared to before the study session, and did not change after six months compared to three months, but increased significantly after one year. ANOVA was employed to analyze whether there was a difference in knowledge using the scale at the four time points, and a significant main effect was found ($p < 0.001$). The results of multiple comparisons in Bonferroni also illustrated significant differences in knowledge at all time points after the study session compared to before the study session. There were no significant differences between 3 months and 6 months, but there were significant differences in knowledge at six months and one year. Interest was highest before the study session, but no statistically significant difference was found.

Table 2. Changes in practice, knowledge, and interest before and after the study session (N = 12).

	Practice					Knowledge					Interest				
	Mean	SD	Range	Bonferroni	F-value	Mean	SD	Range	Bonferroni	F-value	Mean	SD	Range	Bonferroni	F-value
Before study session	2.4	1.2	(0 - 5)	**	11.606 ($p < 0.001$)	2.3	1.1	(0 - 4)	**	25.462 ($p < 0.001$)	8.4	1.2	(6 - 10)	ns	2.384 ($p = 0.087$)
After 3 months	3.8	2.3	(1 - 9)			4.3	1.9	(2 - 8)			6.9	2.4	(2 - 10)		
After 6 months	4.1	2.3	(1 - 9)			4.3	2	(2 - 8)			7.6	1.7	(5 - 10)		
After 1 year	4.7	1.7	(3 - 8)			5.1	1.9	(3 - 9)			7.9	1.5	(5 - 10)		

ANOVA. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

3.3. Specific Practice Changes

The specifics of practice related to a physiotherapeutic perspective are presented in **Table 3**.

Midwives used verbal explanations (75%), breathing instruction (25%), and vaginal palpation (8%) to teach PFMTs in their practice before the training session. None of the midwives performed abdominal ultrasound, abdominal muscle check, or tailbone palpation.

Compared to the pre-session period, one year following the study there was a significant increase in the number of midwives providing breathing instruction (25% vs. 91%, $p = 0.005$) and transabdominal ultrasound (0% vs. 41%, $p = 0.025$), respectively.

Although there was an increase in the number of midwives who provided verbal explanation (75% vs. 100%, $p = 0.083$), conducted an abdominal muscle check (0% vs. 17%, $p = 0.157$) and tailbone palpation (0% vs. 8%, $p = 0.317$) between pre-session and one year following the training session, respectively, this was not statistically significant.

Midwives included all teaching of GP and DA in their practice before the training session. There was a significant increase in the number of midwives who checked for good posture (42% vs. 83%, $p = 0.025$) and who checked for physical pain (17% vs. 75%, $p = 0.008$) one year following the training session. Although the number of midwives who advised on caution when getting up and standing up (50% vs. 83%, $p = 0.102$), breastfeeding posture (67% vs. 92%, $p = 0.180$), and posture for lifting baby (50% vs. 75%, $p = 0.180$) increased one year following the training session, this was not statistically significant.

3.4. Change in Confidence in Teaching PFMT and GP and DA

Changes in confidence in teaching are presented in **Table 4**. Confidence increased with the passage of time, three months, six months, and one year after the study session, compared to before the study session. With regard to confidence in teaching PFMT, there was a significant increase after one year compared to before the study session, and after one year compared to three months. Confidence in teaching GP and DA increased significantly six months and one year after the study session compared to before the study session.

Table 3. Changes in specific practices of teaching of PFMT and GP & DA after 1 year (N = 12).

	Teaching of PFMT						Teaching of GP & DA				
	Verbal explanation	Breathing instruction	Vaginal palpation	Trans abdominal ultrasound	Abdominal muscle check	Tailbone palpation	Check for good posture	Check for physical pain	Caution for getting up and standing up	Instruction for breastfeeding posture	Instruction on posture for lifting baby
Before study session (n)	9	3	1	0	0	0	5	2	6	8	6
After 1 year (n)	12	11	1	5	2	1	10	9	10	11	9
P-value	0.083	0.005**	1.000	0.025*	0.157	0.317	0.025*	0.008**	0.102	0.180	0.180

Wilcoxon signed-rank test ** $p < 0.01$, * $p < 0.05$. Abbreviations: PFMT, Pelvic Floor Muscle Training; GP & DA, Good Posture and Daily Activities.

Table 4. Confidence in teaching of PFMT and GP & DA (N = 12).

	Confidence in PFMT Teaching			Confidence in GP & DA Teaching		
	Mean	SD	Median	Mean	SD	Median
Before study session	2.3	0.5	2	2.4	0.8	2
After 3 months	2.5	0.9	2	2.9	0.7	3
After 6 months	2.8	0.2	3	3.2	0.4	3
After 1 year	3.3	0.5	3	3.3	0.5	3

Wilcoxon signed-rank test **p < 0.01, *p < 0.05. Abbreviations: PFMT, Pelvic Floor Muscle Training; GP & DA, Good Posture and Daily Activities.

3.5. Correlation between Practice and Knowledge, Interest, and Confidence

The results are shown in **Table 5**. Practice was highly correlated with knowledge at three months ($r = 0.800$, $p < 0.01$), six months ($r = 0.949$, $p < 0.001$), and one year post-session ($r = 0.970$, $p < 0.001$). But practice was not correlated with interest at any time point.

Practice was highly positively correlated with confidence in teaching PFMT one year post-training session ($r = 0.843$, $p < 0.001$), and confidence in teaching GP and DA at 6 months ($r = 0.891$, $p < 0.001$) and one year ($r = 0.843$, $p < 0.001$) post training session.

Table 5. Correlation between practice and knowledge, interest, and confidence (N = 12).

	Knowledge			Interest			Confidence in PFMT instruction			Confidence in GP & DA instruction		
	After 3 months	After 6 months	After 1 year	After 3 months	After 6 months	After 1 year	After 3 months	After 6 months	After 1 year	After 3 months	After 6 months	After 1 year
Practice	0.800**			0.451			-0.066			-0.428		
		0.949***			0.502			-0.039			0.891***	
			0.970***			0.458			0.843***			0.843***

ANOVA. ***p < 0.001, **p < 0.01. Abbreviations: PFMT, Pelvic Floor Muscle Training; GP & DA, Good Posture and Daily Activities.

4. Discussion

4.1. Participants' Background

Although several participants in this study had numerous years of experience as midwives, they had little practice or knowledge of midwifery care related to a physiotherapeutic perspective prior to the study session. They found that the source of their knowledge was their school years, and that they had few opportunities to learn about these issues post graduation.

The Japanese midwifery education curriculum does not include lectures and

exercises on physiotherapeutic perspectives, such as those learned in this study session, as a requirement in the study content [15]. The aforementioned situation is similar in the UK, where it has been reported that, although theoretical education on the pelvic floor is increasing, there is a significant lack of practical education, with 70% of midwifery students feeling that education on pelvic floor instruction is inadequate [16].

The midwives in this study were highly interested in learning about the physiotherapeutic perspective prior to the study session. This could be attributed to the fact that the midwives recognized the need to practice midwifery care related to a physiotherapeutic perspective, but had never actually learned about it, and so were interested in attending the study.

4.2. Changes in Midwifery Practice

The practice increased at three months, six months, and one year after the study session compared to the pre-study session, and there was a significant difference in practice at one year compared to the pre-study session. Two factors could account for the increase in midwifery practice after one year. First, knowledge increased significantly at all time points after the study session compared to before the study session, and yet there was a significantly strong positive correlation between practice and knowledge, suggesting that knowledge is highly relevant to practice. Additionally, there was a significant difference in knowledge after six months and one year, suggesting that the additional lecture given eight months after the study session to strengthen practice may have been useful. It is possible that the review of practical skills from a physical therapy perspective, focusing on questions that arise when midwives practice midwifery care rather than a one-time study session, further improved knowledge and consolidated practice.

Second, midwives' confidence increased after the study session in both PFMT and GP and DA instruction compared to before the study session, and there was a significant strong positive correlation between practice and confidence one year later, indicating that midwives' confidence as implementers influences their practice. It is predicted that the midwives' provision of practice may have elicited a positive response from the subjects, which might, in turn, have helped to maintain their motivation to practice.

From the above, it was inferred that the participants gained knowledge and confidence regarding the effectiveness of midwifery care from a physiotherapeutic perspective, which they were able to put into practice.

Urinary incontinence and pelvic girdle pain are troubling symptoms for prenatal and postpartum women, affecting their daily lives and physical and psychological quality of life. Prenatal and postpartum women expect their healthcare providers to listen to their physical symptoms without downplaying them, to provide information and advice during prenatal checkups and prenatal classes, and to be willing to provide specialized care [17]-[20]. While this is perhaps so, it is predicted that the midwives' increased provision of practice in the current study may

have elicited a positive response from the participants, which might have helped to maintain their motivation in practice.

4.3. Specific Changes in Practice after One Year Related to the Physiotherapeutic Perspective

4.3.1. Changes in Specific PFMT Practices

Most midwives (75%) only gave verbal explanations pertaining to PFMT at the beginning of the study.

Most pregnant and postpartum women are generally given leaflets by their healthcare providers instructing them to perform PFMT, but they are not told how to do so, thus they are unsure if they are doing it correctly [21]. Since the pelvic floor muscles constitute a deep muscle group, it is difficult to understand the sensation of contraction through verbal instruction alone, and direct instruction methods are desired. Such methods include vaginal palpation, transabdominal ultrasound, abdominal muscle check, and palpation of the tailbone, which were addressed in the lecture at the study session. However, one year after the study session, although all participants were able to provide verbal explanations on PFMT and combine them with breathing techniques, very few midwives were practicing more direct methods such as vaginal palpation or tailbone palpation. Transvaginal palpation is considered essential for teaching PFMT [22]. For postpartum women, PFMT instruction by transvaginal palpation has been shown to help acquire pelvic floor muscle contractions through tactile feedback [23]. In Japan, only doctors and midwives are legally allowed to perform internal examinations. It was again confirmed that, even though midwives have the authority to perform internal examinations, few midwives perform vaginal palpation, and most midwives use their authority only during delivery. Conversely, among the direct teaching methods, only the method of teaching PFMT using transabdominal ultrasound increased significantly. Although previous studies have shown the possibility of selecting PFMT teaching methods according to the respective advantages of vaginal palpation and transabdominal ultrasound [24], the results of this study indicate that midwives who perform PFMT tend to choose transabdominal ultrasound as a tool that can be easily utilized. Additional experience may be needed for midwives to implement specific and direct teaching methods in teaching PFMT.

4.3.2. Changes in Specific GP and DA Practices

Most midwives (67%) only gave instructions about postures for breastfeeding prior to study participation with very few (17%) giving instruction on checking for physical pain.

Recent studies suggest that women who present with persistent postpartum pain may be at an increased risk of developing postpartum depression [25]-[28]. Women often do not seek help for their symptoms from healthcare providers despite the tremendous burden of their pain, which makes it difficult for them to properly access professional care [29]. According to a study by Wuytack *et al.* [30], women felt that back and pelvic girdle pain was of low priority compared to ob-

stetric abnormalities and the baby, and stated that they would forget to discuss it if they happened to be pain-free during a prenatal and postpartum checkup, and received the general advice that “time would tell” if they mentioned pain when seeking advice or help. The most notable change in specific GP and DA practices was that, while few midwives identified physical pain before the study, one year later there was a significant increase in the number of midwives who identified physical pain and practiced good posture checks. These practices will help prenatal and postpartum women to become aware that they can consult midwives not only about delivery and the baby, but also about their own back pain, pelvic girdle pain, and other body pain. As such, they will have a proper foothold from which to seek professional treatment to improve their symptoms.

4.4. Strengths and Limitations

This study has several notable strengths. First, it investigated not only changes in midwives’ knowledge before and after the study session, but also changes in their practice over a one-year period. Second, in Japan, where it is uncommon for physical therapists to work in obstetrics, this study made a valuable contribution to inter-professional collaboration and maternal health. To the best of our knowledge, this is the first study in Japan to demonstrate the potential for collaboration between physical therapists and midwives.

A limitation of this study is that the participants were experienced midwives working at a maternity clinic in Tokyo, and were limited to one location. The research facility in this study was a place where midwives could provide independent care to pregnant women and postpartum mothers. However, in university hospitals with a high number of high-risk pregnancies, physicians may intervene more frequently, potentially limiting the clinical practice of midwives. Another limitation of this study was the small sample size. Therefore, the results of our study cannot be generalized to all midwives. Further research in this field is needed.

5. Conclusions

This study examined changes in midwives’ practice one year after the holding of a “study session to develop a physiotherapeutic perspective” and after they had learned, from a physiotherapist, about posture appropriate for prenatal and postpartum women, as well as about pelvic girdle pain and urinary incontinence related to pregnancy. The results illustrated that the practice of midwifery care related to a physiotherapeutic perspective increased with the passage of time, three months, six months, and one year after the study session compared to before the study session, and there was a significant difference in practice at one year compared to before the study session. Knowledge increased significantly at all time points after the study session compared to before the study session, and confidence to practice teaching also increased significantly after one year. There was a significant positive correlation between practice and knowledge at all time points after the study session, as well as a significant positive correlation between practice

and confidence in teaching one year later.

The results of this study suggest that midwifery care practice related to a physiotherapeutic perspective is related to knowledge and confidence in teaching. Education of other professions with physical therapists has the potential to improve the quality of midwifery care, although further research is required to address this issue.

6. Future Issues

In Japan, the number of working pregnant women is increasing along with women's active roles in society, and the childbearing age is also rising. Against this background, it can be inferred that postpartum pelvic floor disorders will continue to increase. Among the health issues that can act as barriers for postpartum women returning to work is pelvic girdle pain and persistent pain can lead to a long-term decrease in activity and economic loss [31]. Physical care is an important factor for women when it comes to staying mentally and physically healthy while balancing work and child rearing. In the future, midwives need to raise awareness on the importance of midwifery care related to a physiotherapeutic perspective, consciously focusing on physical symptoms and providing specific and direct care.

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Informed Consent

All study participants were given a study information sheet and obtained written informed consent from all participants prior to their participation in this study.

Declaration of Conflicting Interests

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

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