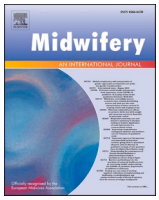
Midwifery 131 (2024) 103936

Contents lists available at ScienceDirect

Midwifery

journal homepage: www.elsevier.com/locate/midw



Patient perception of labor support behaviors provided by Finnish midwives

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ARTICLE INFO

Keywords:
Midwife
Labor support
Birth

ABSTRACT

Background: Almost all births in Finland occur in hospitals, but the concept of labor support behavior is not well-known among Finnish midwives.
Objective: The primary aim was to increase perceived labor support as measured by BANSILQ.
Methods: This study was tailored to evaluate the impacts of short on-the-job training interventions for midwives (n=70) in labor support given to mothers. The training was conducted at one university hospital and and one regional hospital during 2012. The trainings were carried out twice at both hospitals to reach as many miwdwives as possible to participate. Two university hospitals—one regional and one central—were selected as controls. New mothers were asked to complete the Bryanton Adaptation of the Nursing Support in Labor Questionnaire (BANSILQ) in the postpartum wards at all the selected hospitals before the intervention (n=1500) and after the intervention (n=1500). The data were linked to the Finnish Medical Birth Register (MBR). As this is an in-job training intervention study and not a trial, it has not been registered in a trial registry.
Results: The response rate was 68% (n=1020) for the pre-intervention survey and 47% (n=704) for the post-intervention survey. At the regional-level intervention hospital, the mean length of the second stage of childbirth decreased significantly. A bonding time of at least three minutes was three times more likely at both intervention hospitals. Support for breastfeeding was twice as likely at the university-level hospital after the intervention. In all the study hospitals, mothers with less education were more likely to receive tangible and informal support than highly educated mothers.
Conclusions: This short on-the-job intervention did not increase labor support provided by Finnish midwives in its entirety, and the effect on birth outcomes was minimal. However, support for breastfeeding increased, and some types of support were targeted at those who needed it most. To improve midwifery care, both training and sufficient resources are needed.

Background

Labor support describes the work of caring or social support that is provided to women during labor and birth (Payant, Davies, Graham, Peterson, & Clinch, 2008). Labor support includes emotional, tangible, and woman's advocacy support, guidance, and provision of information (Bryanton, Fraser, Davey, & Sullivan, 1994; Hodnett, Gates, Hofmeyr, & Sakala, 2007; Hunter, 2002; Miltner, 2002; Sauls, 2006). Sauls (2006) identified six types of labor support: tangible support, advocacy, emotional supported by reassurance, emotional supported by creating control, security, and comfort, emotional support via nurses' care behaviors, and informational support. However, in our study, labor support is defined according to Bryanton et al. (1994) as emotional, tangible, and informational support. According to Nikula, Laukkala, & Pölkki (2015), mothers perceived emotional assistance to be most important. From the list of midwives' labor support behaviors provided in the survey, the following were considered most helpful: giving praise, treatment on an individual basis, and answering questions truthfully and understandably.

According to other previous studies, midwives can provide strength to the expectant mother, which is needed to face the challenges associated with childbirth (Lundgren, 2004; Kennedy, 2002; Ekström, 2012). Women giving birth prefer midwives to help them with breathing and relaxation techniques, provide information about different pain

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https://doi.org/10.1016/j.midw.2024.103936
Received 8 March 2022; Received in revised form 18 December 2023; Accepted 23 January 2024
Available online 2 February 2024

relief methods, and help them feel calm and optimistic (Barrett & Stark, 2010).

It is also known that nurse-midwives' and doulas' supportive care improves birth outcomes (Sleutel, 2002). Epidural anesthesia for pain relief during delivery has been much more common in women who did not receive suport from a doula during delivery (McGrath & Kennell 2008), one-to-one midwifery care (Fox et al., 2013), or continuity of care by a primary midwife (McLachlan et al., 2012). Also, other medical pain relief or the need for obstetric interventions is lower among mothers who receive one-to-one midwifery care (Fox et al., 2013). Moreover, labor support decreases the number of cesarean sections (McGrath & Kennell, 2008; Klaus et al., 1986; McLachlan, 2012), the duration of childbirth (Hemminki et al., 2011; Klaus et al., 1986), first- and second-degree perineal ruptures, and episiotomies (Fox et al., 2013; McLachlan et al., 2012). Furthermore, labor support has shortened the period of puerperium spent in the hospital (McLachlan et al., 2012) and prevented postpartum mood disorders (Bland, 2009). The newborn mothers who receive labor support during childbirth have been found to require less specific monitoring and therapy than newborns whose mothers receive standardized management (Fox et al., 2013; Klaus et al., 1986; McLachlan et al., 2012). Labor support from a doula can also reduce expectant mothers' anxiety by helping women relax during childbirth (McGrath & Kennell, 2008).

Continuous labor support is term closely related to delivery support, but it is a numeric measure of time with a woman in labor during active labor. According to a Cochrane review (Hodnett et al., 2013; Bohren et al., 2017), continuous labor support did not affect the initiation of breastfeeding. However, it is known that midwives can promote and create a bond between the newborn and mother by providing continuous support during labor, placing the newborn skin-to-skin on the mother's chest immediately after delivery until the infant latches for the first feeding, encouraging continued breastfeeding, and keeping the mother and infant always together in the first hours and days after delivery (Kennell, 2005). Studies have also shown that nurses directly impact breastfeeding success through emotional, informational, and tangible support (Hong et al., 2023).

In Finland, midwifery training provides the capacity for independent care of regular pregnancy, childbirth, and postpartum. Perinatal healthcare in Finland is family-oriented, and the midwife is independently responsible for normal care during childbirth. In a standard birth, midwives use their knowledge from education and working life, including non-pharmacological birth pain relief methods (Nikula et al., 2015). According to McGrath & Kennell (2008), doula support includes close physical proximity, touch, and eye contact with the laboring woman and teaching, reassurance, and encouragement of the woman and her male partner. Doulas who are not hospital employees or the woman's spouse also provide labor support in Finnish hospitals. According to the Finnish doulas association, "A doula is a support person for birth that offers emotional, physical, and informational support to the birthing person and to other possible support persons according to their wishes during pregnancy, birth, and the postpartum period. A doula is not a regulated profession, so anyone can define themselves as a doula." (Finnish doula.)

Midwife-to-patient ratio means a mandated minimum number of midwives working in a particular ward to the number of patients (Collins Dictionary, 2023). Although increased attention by staff may reduce the risk of adverse outcomes while supporting coping mechanisms in labor and supporting infant feeding (Turner et al., 2021), there is no specified staff ratio of midwife to patient in Finland. The staff ratio can vary, depending on the healthcare system and the specific setting. Usually, a Finnish midwife assists one to three births during her shift. According to Sleutel et al. (2007), the lack of midwives is an obstacle to delivery support. Currently, this is also the situation in maternity hospitals in Finland.

In Finland, a midwife's role is coordinating the care of childbearing women and collaborating with obstetricians or other specialists when a woman has medical complications or risk factors (directives 2013/55/EU and 2005/36/EC). A midwife provides support during labor, including pain management, emotional support, and assistance with breastfeeding and newborn care. However, the phrase *labor support behavior of midwives* is not well-known or clear among Finnish midwives, so research on labor support and spreading general information about it is important. Consequently, this study measured patient perception of labor support behaviors provided by Finnish midwives after 90 minutes of training. The study was part of the Good Birth Project implemented in Finland from 2012 to 2014.

Methods

A descriptive cross-sectional study design used a short on-the-job training intervention component for midwives called "Encourage, Praise, and Touch." On-the-job training interventions aimed to help the midwives understand the content and importance of labor support for parturients and get them to implement labor support as well as possible. The duration of the on-the-job training intervention was 90 minutes per hospital. The training was implemented twice at both hospitals. The training sessions were arranged so that as many midwives as possible could participate in the training sessions, but due to the shift work and the absence of available work, training everybody was impossible. The teaching methods used were lectures, open discussion, case exercises, competition in small groups, and independent assignments. The training material consisted of postcards that fit in the midwives' pockets, large roll-ups, and posters about labor support behavior, the last of which were distributed in both intervention hospitals (Kemppainen et al., 2014).

The university hospital in Oulu and the regional hospital at Hyvinkää were chosen as intervention hospitals. The special responsibility area of Oulu University Hospital serves the Northern area of Finland and is home to 741,000 people. Approximately 3,200 babies a year are born at Oulu University Hospital. Hyvinkää Hospital serves a population of roughly 190,000 and comprises five municipalities. Hyvinkää Hospital is in the Uusimaa region, approximately 50 kilometers (30 miles) north of the capital Helsinki. About 2,100 babies a year are born at Hyvinkää Hospital. In the delivery room in both hospitals, midwives take care of normal deliveries independently, consulting a doctor if necessary. Both hospitals are open 24/7, are baby-friendly, have family rooms, and allow fathers to participate in the birth.

The total number of trained midwives during the intervention was 108: 18 midwives at Hyvinkää Hospital on November 2, 2012; 20 midwives on November 7, 2012; 25 midwives on October 29, 2012; and 45 midwives on October 31, 2012, at Oulu University Hospital. Almost all midwives in both hospitals were trained. Shift work and absences prevented a few midwives from participating. An exact number of absentees was not obtained.

Two regional hospitals, Kanta-Häme Central Hospital and Salo Hospital, were selected as controls for Hyvinkää Hospital. Two university hospitals, Kuopio University Hospital and Tampere University Hospital, were the controls for Oulu University Hospital. The hospitals for the intervention and control groups were selected based on a similar number of deliveries per year and a similar number of midwives. All the hospitals granted permission for the research.

To discover the effects of intervention, two surveys—pre- and post-surveys—were conducted at postnatal wards at all selected hospitals, which were intervention and control hospitals in 2012 and 2013 (Table 1). Before the training intervention, the pre-survey was offered to mothers, fathers, and midwives. Three months after the intensive 1.5-hour on-the-job training intervention for midwives, the post-survey was offered to the target groups: mothers, fathers, and midwives. Another article will be written about the results of fathers' and midwives' surveys.

In both surveys for mothers, the Bryanton Adaptation of the Nursing Support in Labor Questionnaire (BANSILQ) was used to measure the

Table 1
The study hospitals, number of recruited and participating mothers, and response rates in control and intervention hospitals in the Good Birth project in Finland.

Hospitals	Total recruited	Pre survey	Pre survey	Post survey	Post survey
	(N)	(N)	(%)	(N)	(%)
Intervention Hyvinkää hospital *	300	189	63	130	43
Control Central hospital	180	105	58	78	43
Control Regional hospital **	120	73	61	83	69
Intervention Oulu University hospital	300	237	79	160	53
Control Kuopio University hospital	300	167	56	70	23
Control Tampere University hospital	200	217	72	183	61
Total	1500	1020	68	704	47

* The hospital district of Hyvinkää.
** The hospital district of Salo.

perceived support defined as emotional, tangible, or informal for mothers during childbirth in Finland (Bryanton et al., 1994). The BANSILQ is an internationally recognized survey instrument and tool designed to elicit the perceptions of adult postpartum mothers concerning how helpful certain supportive nursing behaviors were to them during their childbirth experiences. It includes 25 questions regarding the behaviors of midwives during childbirth and eight questions about the demographic characteristics of the mothers.

The BANSILQ has been proven reliable, using Cronbach's alpha coefficients ranging from 0.88 to 0.99 in several previous studies (Abushaikha & Sheil, 2006; Bryanton et al., 1994; Corbett & Callister, 2000). Participating mothers rate the helpfulness of each activity or procedure implemented during childbirth using a 5-point Likert scale, ranging from 1 (not at all helpful) to 5 (very helpful). A zero (0) rating is assigned when an activity or procedure has not been experienced. Questions regarding the childbirth experience are answered using one of three alternatives: positive, negative, and cannot say. The studied outcomes were emotional, tangible, and informal support; timing (under 5 minutes [or not]); length of bonding (skin-to-skin contact with the parent); and support received for breastfeeding.

Official translators who were not involved in the research translated the BANSILQ instrument (Bryanton et al., 1994). Before conducting the pre-study, a pilot test was performed with ten mothers. Experts in the Good Birth Project reviewed the translation of the instrument and accepted it with a few concept modifications that aligned it more closely with Finnish care culture. According to previous research (Melender et al., 2006), the suitability of the BANSILQ instrument for the Finnish healthcare system increased its reliability in this context.

Altogether, 3,000 mothers in postpartum wards who had had a normal delivery in the previous 1–2 days were approached and invited to participate in the study. The selection criterion for mothers to participate was sufficient Finnish language skills, but the mothers who had had elective Cesarean sections were excluded.

Once verbal consent was obtained, midwives at the postpartum ward provided the mother with a cover letter, the BANSILQ (Bryanton et al., 1994) questionnaires, an informed consent letter, and a request to use birth register data. Returning the completed questionnaires and signed informed consent letter signaled the participant's consent.

By using the mothers' ID codes, the pre-and post-survey data of the mothers who gave permission for data linkage were linked to the Medical Birth Register (MBR) data to study the intervention's effect on childbirth outcomes. The MBR contains information on maternal background, use of maternity care, adverse outcomes during pregnancy and delivery, interventions during delivery, all live births, stillbirths of fetuses with a birthweight of at least 500g or a gestational age of at least 22+0 weeks, and infant health outcomes up to the age of seven days for all infants born in Finland. Delivery hospitals collect the data, which is completed centrally by linking the data with the Central Population Register (CPR) and the Causes-of-Death statistics. Diagnoses are recorded as International Classification of Diseases (ICD)-10 codes by hospital healthcare personnel.

The MBR linkage was made in 2016 when the data on the studied mothers were available. The outcomes this study used were the use of oxytocin, epidural or spinal analgesia, and vaginal non-assisted delivery, as well as the mean length of childbirth (first and second stages of childbirth), low 1- and 5-minute Apgar scores (0–6), and a hospital stay of more than seven days. In 2014, the average treatment time in the hospital after delivery was 2.9 days, ranging from 2.1 to 3.8 days (Perinatal statistics—parturients, deliveries, and newborns, 2016).

The variables were described using frequency distribution tables, cross-tabulation, and statistics. Frequencies and percentages or medians described the distribution of the variables. Nonparametric methods were used for data analyses. Background information, maternity care use, and interventions among primiparous and multiparous women in intervention and control hospitals were described. Pre- and post-surveys and birth register data were compared using chi-square and Mann–Whitney U tests. Values were considered statistically significant at $p < 0.05$ and as suggestive results at $p < 0.1$.

The sum variables were calculated using means of variables with values 1–5 (regarding how helpful the support was). Emotional, informational, and tangible support was compared between pre- and post-studies by median and nonparametric Mann–Whitney U tests. Bonding and support for breastfeeding were studied by cross-tabulation (%) and chi-square tests. Logistic regression was used to adjust for confounding factors. Variables were entered in blocks (groups) into the model. The dependent variable and the independent categorical covariates age, marital status, parity, education, and support person were selected for the first block. The categorical explanatory covariate time was entered for the second block. The stepwise forward selection method (likelihood ratio) was used with the first block to select variables and for all variables in a single step in the second block. Within the contrast method, the reference category was the first category. Although the survey was distributed to mothers, fathers, and midwives, this article only discusses the results of the mothers.

Ethical approval for the study was obtained from the hospital district of V and X University Hospital 31.1.2022.

Results

Pre-intervention questionnaires were distributed to 1500 mothers, of whom 1020 responded, yielding a response rate of 68%. The response rate for the pre-survey was highest at Oulu University Hospital (79%) and lowest at Kuopio University Hospital (56%).

The post-intervention questionnaires were also distributed to 1500 mothers, of whom 704 responded, yielding a response rate of 47%. The response rate for the post-survey was highest at Salo Regional Hospital (69%) and lowest at Kuopio University Hospital (23%). During the pre-survey, 1007 (67%) mothers permitted the study to use the birth register data. All mothers gave their permission (n=704) during the post-survey (Table 1).

At the intervention and control hospitals, the mean age of mothers varied between 29.5 and 30.1 across the pre- and post-surveys (Table 2). The regional intervention post-survey had fewer mothers younger than 25 than in the pre-survey. Most mothers were married or cohabiting. Only a few were single or divorced. The only significant difference between the pre- and post-surveys was that at the regional control hospitals, more mothers were single in the post-survey than in the pre-survey. The proportion of primiparous mothers varied from 29 to 45, the lowest at the intervention university hospital. However, no significant difference was found between the pre- and post-intervention surveys. Around

Table 2
Background characteristics of women in intervention and control hospitals by level of hospital, pre- and post-intervention studies in 2012–2013 in Finland (%).

	Intervention hospitals								Control hospitals							
	University				Regional				University				Regional			
	Pre n=237	Post n=160	Δ*	p-value**	Pre n=189	Post n=130	Δ*	p-value**	Pre n=384	Post n=253	Δ*	p-value**	Pre n=178	Post n=161	Δ*	p-value**
Mean age, years (Std)	29.6 (5.1)	30.0 (4.9)	0.5	0.351	29.5 (5.4)	30.5 (4.6)	1.0	0.074	29.8 (4.8)	29.7 (5.0)	-0.1	0.860	30.0 (5.0)	30.1 (4.7)	0.1	0.882
Age group																
< 25	17.7	13.8	-3.9	0.520	20.1	6.9	-13.2	0.003	14.3	17.0	2.7	0.416	12.4	7.5	-4.9	0.126
25–34	64.6	69.4	4.8		58.7	73.8	15.1		70.6	65.6	-5.0		67.4	77.0	9.6	
35+	17.7	16.9	-0.8		21.2	19.2	-2.0		15.1	17.4	2.3		20.2	15.5	-4.7	
Marital status																
Married	66.7	64.4	-2.3	0.773	56.8	58.5	1.7	0.549	57.2	62.1	4.9	0.416	56.9	50.3	-6.6	0.005
Cohabiting	31.6	33.8	2.2		37.4	37.7	0.3		39.2	33.6	-5.6		40.3	41.6	1.3	
Single	1.3	1.9	0.6		4.2	3.8	-0.4		3.4	3.6	0.2		1.1	8.1	7.0	
Divorced	0.4	0	-0.4		1.6	0	-1.6		0.3	0.8	0.5		1.7	0	-1.7	
Parity																
Primipara	32.1	29.4	-2.7	0.569	45.3	44.6	-0.7	0.909	41.2	42.3	1.1	0.791	38.3	37.3	-1.0	0.839
Multipara	67.9	70.6	2.7		54.7	55.4	0.7		58.8	57.7	-1.1		61.7	62.7	1.0	
Education																
≥ 13 yrs education	49.4	51.2	1.8	0.713	48.1	59.2	11.1	0.051	51.8	50.2	-1.6	0.691	45.0	50.3	5.3	0.327
< 13 yrs education	50.6	48.8	-1.8		51.9	40.8	-11.1		48.2	49.8	1.6		55.0	49.7	-5.3	
Other																
Support person during labor																
Father of the child	96.2	91.2	-5.0	0.113	94.7	94.6	-0.1	0.784	95.6	94.4	-1.2	0.779	93.3	95.7	2.4	0.525
Other	1.7	3.8	2.1		2.1	3.1	1.0		2.3	2.8	0.5		2.8	2.5	-0.3	
Nobody	2.1	5.0	2.9		3.2	2.3	-0.9		2.1	2.8	0.7		3.9	1.9	-2.0	

* Δ describes the difference between pre- and post-intervention studies.
** P-values for t-tests or chi-square tests between pre- and post-intervention studies.

half the mothers had at least 13 years of education. Over 90% of the mothers were accompanied by the father of the expected child during its birth, while 2–5% had no one present. However, no significant difference existed between pre- and post-surveys.

At the intervention university-level hospital, emotional and informal support decreased between the pre-and post-surveys (Table 3). The longer bonding period (30+ minutes) increased at the university- and regional-level intervention hospitals, as did support for breastfeeding at the university-level intervention hospital. After adjusting for confounders, bonding for 30 minutes or longer remained significant and was three times more likely in the post-survey than in the pre-survey (Table 5). Support for breastfeeding was significant and twice as likely in the post-survey than in the pre-survey (Table 5). At the university-level control hospital, emotional support decreased between the pre- and post-surveys (Table 3). However, after adjusting for confounders, none of the results were significant at the control hospitals.

The logistic regression showed some additional statistically significant findings (Supplementary material). At the intervention hospitals, mothers with fewer years of education were more likely to have tangible and informal support than highly educated mothers, and in all the study hospitals, multiparous mothers were more likely to have their baby in bonding within five minutes. At the intervention hospitals, primiparous mothers were less likely to have tangible support than multiparous mothers. At the control hospitals, multiparous mothers were more likely to have 30 minutes or more bonding time than primiparous mothers.

At the intervention hospitals, the only significant difference between the pre- and post-surveys in the MBR outcomes studied was in the length of the second stage of childbirth at the regional-level hospital, where the length of the second stage of childbirth was significantly shorter (Table 4). However, at the control hospitals, more significant changes in the MBR outcomes studied were seen (Table 4). At the regional-level control hospitals, oxytocin use decreased significantly. At the university-level control hospitals, the length of the second stage of childbirth decreased between the pre-and post-surveys, and vaginal non-assisted delivery increased significantly. However, at the regional-level control hospitals, the results did not remain significant after adjusting for confounding factors with the logistic regression (Table 5).

At the intervention and control hospitals (Supplementary material), multiparous women were less likely than primiparas to receive oxytocin, use epidural or spinal analgesia or other medical pain relief, and have a vaginal non-assisted delivery, an episiotomy, and a newborn with low (< 7) 1-minute Apgar scores. At the intervention hospitals, single mothers were more likely to have babies with low 5-minute Apgar scores. At the control hospitals, primiparous mothers were less likely to have a lengthy postpartum stay than multiparous mothers.

Discussion

Our study has shown that a short on-the-job training intervention in maternity wards does not increase labor support for childbirth. However, even after a brief on-the-job training intervention, the support received for breastfeeding increased, and some types of support targeted those who needed it the most. Furthermore, some childbirth outcomes changed. At the intervention hospitals, a 30-minute bonding period was three-fold, and breastfeeding support was two-fold more likely after the intervention, while no significant changes were found at the control hospitals. At the intervention hospitals, the mothers with less education—who most likely needed more support—also received more tangible and informational support than the highly educated mothers.

A previous Finnish study (Lampinen et al., 2009) indicated that older, highly educated mothers were more eager than younger mothers to receive all the available information regarding their pregnancy and childbirth. However, some highly educated mothers may already be so knowledgeable that they do not feel they need support. In this study, midwives noticed that mothers with less education need more support, thus providing them more support than highly educated mothers. Conversely, the midwives' perspective seems to be that highly educated Finnish women often have an abundance of information that increases the stress and pressure of childbirth (Lampinen et al., 2009), while young women with less education rely more on childbirth being a natural process (Hakala et al., 2017).

In our study, emotional and informal support decreased at the intervention university-level hospital between the pre- and post-surveys, and primiparous mothers were generally less likely to have tangible support than multiparous mothers. One reason for the decreased emotional and informal support at the university hospital might be that there has been a trend to centralize births in Finland, and many delivery hospitals have closed. Over half of Finnish maternity hospitals have closed in the last 40 years; there are now only 23 maternity hospitals. This development has led to an almost doubling of the average number

Table 3
Labor support, bonding, and support for breastfeeding in pre- and post-intervention studies among women in intervention and control hospitals by level of hospital in Finland 2012–2013.

Outcome	Intervention hospitals								Control hospitals							
	University				Regional				University				Regional			
	Pre	Post	Δ*	p-value	Pre	Post	Δ*	p-value	Pre	Post	Δ*	p-value	Pre	Post	Δ*	p-value
	n=237	n=160			n=189	n=130			n=384	n=253			n=178	n=161		
Labor support																
Emotional support (md)**	4.6	4.5	-0.1	0.001	4.6	4.5	-0.1	0.431	4.6	4.5	-0.1	0.031	4.7	4.6	-0.1	0.148
Informational support (md)**	4.0	3.8	-0.3	0.035	4.0	4.0	0.0	0.867	3.8	3.8	0.0	0.034	4.0	4.0	0.0	0.845
Tangible support (md)**	4.3	4.0	-0.3	0.154	4.2	4.0	-0.2	0.540	4.0	4.0	0.0	0.579	4.2	4.2	0.0	0.966
Bonding within 5 minutes (%)* **	91.5	94.9	3.4	0.208	87.6	84.8	-2.8	0.485	86.8	91.2	4.4	0.091	89.7	88.5	-1.2	0.728
Length of bonding 30+ minutes (%)* **	32.0	64.8	32.8	0.000	67.3	80.2	12.9	0.016	75.3	79.0	3.7	0.310	76.6	78.9	2.3	0.630
Support for breastfeeding (%)* **	50.8	74.8	24.0	0.000	79.1	77.4	-1.7	0.722	80.4	80.8	0.4	0.920	76.1	79.1	3.0	0.523

* Δ describes the difference between pre- and post-intervention studies.
** In comparisons between pre- and post-studies, the non-parametric Mann-Whitney U test was used.
*** In comparisons between pre- and post-studies, the chi-square test was used.

Table 4
Interventions during Labor, length of labor, low Apgar scores, and long post-partum stay of infants among women in intervention and control hospitals by level of hospital in pre- and post-intervention studies in 2012–2013 in Finland (%/mean).

	Intervention hospitals								Control hospitals							
	University				Regional				University				Regional			
Interventions and outcomes	Pre	Post	Δ*	p-value	Pre	Post	Δ*	p-value	Pre	Post	Δ*	p-value	Pre	Post	Δ*	p-value
	n=237	n=160			n=189	n=130			n=384	n=253			n=178	n=161		
Use of oxytocin, %	55.7	47.5	-8.2	0.109	66.7	65.4	-1.3	0.811	51.3	53.8	2.5	0.540	61.3	47.8	-13.5	0.012
Use of epidural/spinal, %	66.2	63.7	-2.5	0.609	76.0	76.9	0.9	0.855	63.1	64.0	0.9	0.806	61.3	61.5	0.2	0.975
Use of other medical pain relief, %	3.8	4.4	0.6	0.774	5.2	6.2	1.0	0.717	9.2	11.1	1.9	0.447	20.4	16.8	-3.6	0.385
Use of non-medical pain relief, %	47.7	43.1	-4.6	0.372	21.4	26.2	4.8	0.317	58.5	58.9	0.4	0.914	58.0	59.0	1.0	0.852
Vaginal non-assisted, %	88.6	91.9	3.3	0.289	83.9	77.7	-6.2	0.164	87.7	92.9	5.2	0.034	86.2	86.3	0.1	0.968
Episiotomy, %	19.4	20.0	0.6	0.884	37.0	40.8	3.8	0.493	20.5	22.5	2.0	0.542	13.3	16.8	3.5	0.363
Length of 1st stage of labor (in minutes), mean	715.2	723.3	8.2	0.860	709.2	744.8	35.5	0.678	814.6	761.2	-53.4	0.202	766.7	714.6	-52.1	0.371
Length of 2nd stage of labor (in minutes), mean	22.4	20.7	-1.6	0.614	58.0	30.7	-27.3	0.007	47.4	34.7	-12.7	0.006	30.0	28.7	-1.3	0.736
1-minute Apgar scores < 7, %	2.1	3.8	1.7	0.323	4.2	3.9	-0.3	0.897	4.4	2.4	-2.0	0.185	5.0	7.5	2.5	0.340
5-minute Apgar scores < 7, %	0.8	1.3	0.5	0.185	1.6	0.8	-0.8	0.535	1.0	0.4	-0.6	0.374	1.1	1.2	0.1	0.906
Postpartum stay 7+ days, %	1.3	1.9	0.6	0.609	0.5	2.3	1.8	0.156	1.8	2.4	0.6	0.607	1.1	0.6	-0.5	0.629

* Δ describes the difference between pre- and post-intervention studies.
** P-values for t-tests, Mann-Whitney's or chi-square tests between pre- and post-intervention studies.

Table 5
Adjusted* odds ratios** (OR) and 95% confidence intervals (CI) of delivery and infant outcomes after intervention in intervention and control hospitals, Finland 2012–2013, %.

Outcome or intervention	Intervention hospitals		Control hospitals	
	OR	**95% CI**	**OR**	**95% CI**
Emotional support	0.67	0.37–1.18	1.06	0.63–1.78
Informational support	0.79	0.58–1.10	0.80	0.61–1.06
Tangible support	1.05	0.73–1.53	0.96	0.71–1.30
Bonding within 5 minutes	1.05	0.63–1.76	1.32	0.87–2.02
Length of bonding 30+ minutes	2.93	2.09–4.10	1.20	0.86–1.66
Support for breastfeeding	1.92	1.36–2.70	1.05	0.76–1.46
Use of oxytocin	0.85	0.62–1.16	0.87	0.66–1.14
Use of epidural/spinal	1.02	0.73–1.43	1.05	0.80–1.38
Use of other medical pain relief	1.19	0.59–2.40	1.10	0.74–1.62
Use of non–medical pain relief	1.00	0.73–1.40	1.03	0.79–1.35
Vaginal non–assisted	1.06	0.67–1.68	0.72	0.47–1.10
Episiotomy	1.24	0.84–1.84	1.20	0.84–1.72
1–minute Apgar scores < 7	1.31	0.57–2.98	0.90	0.48–1.71
5–minute Apgar scores < 7	0.92	0.21–3.93	0.68	0.17–2.72
Postpartum stay 7+ days	2.24	0.63–8.01	0.90	0.32–2.57

* Adjusted for maternal age, civil status, parity, education, having a supporting person during delivery.
** Reference group = women participating in the pre-intervention study.

of births per hospital. Two hospitals were closed near Oulu University Hospital. Perhaps even after receiving on-the-job-training, the midwives had insufficient time to support the mothers emotionally and underestimated the information the mothers needed. The latest might also be the case with tangible support: midwives may think multiparous mothers already have all the required information. However, according to an earlier Finnish study (Nikula et al., 2015), emotional, tangible, and informational labor support enhanced the mothers' childbirth experiences. Thus, labor support should be provided for every mother during childbirth. Women with a severe fear of childbirth especially benefit from a midwife's ongoing support during childbirth (Sydsjö et al., 2015). Nikula et al. (2015) also highlighted that an evidence-based model of childbirth support should be used for nursing and midwifery education and clinical practice.

In our study, single mothers were more likely to have babies with low 5-minute Apgar scores. These results align with a previous study showing that supporting depressed, unemployed, and single mothers is crucial in preventing bonding difficulties with the newborn after delivery (Figueiredo, 2009). It is also known that adolescent needs are focused on pain relief, nonjudgmental nursing care, and emotional support (Sauls, 2004), breastfeeding is less common, and the breastfeeding period is shorter among younger than older mothers (Henrickson, 2006).

At the intervention and control hospitals, multiparous women were less likely than primiparous women to receive oxytocin, use epidural or spinal analgesia or other medical pain relief, have vaginal non-assisted delivery, an episiotomy, and a newborn with low (<7) 1-minute Apgar scores. They were also likelier to bond with their baby within five minutes of delivery. According to a previous study, initial breastfeeding begins on average at 41 minutes of age and lasts for 51 minutes (Hakala et al., 2017). Multiparous mothers already have the childbirth experience, so having a generally easier time in labor and delivery might be expected. This ease might also influence the fact that they receive less support during childbirth (Hirvonen, 2000) even if they need it (Lampinen and Vehviläinen-Julkunen, 2009). However, Nikula et al. (2015) observed that all mothers perceived emotional assistance as the most important, especially giving praise, providing individual treatment, and answering questions truthfully and understandably.

According to Kaunonen et al. (2012), all mothers need personal breastfeeding support, and peer supported by trained and experienced peer supporters during pregnancy, hospitalization, and the postnatal period ensures that breastfeeding continues.

An interesting finding was that the second stage of labor was shortened only at the regional hospital. Previous literature has shown that continuity of care by a primary midwife during childbirth contributes to the natural progression of childbirth (McLachlan et al., 2012) and can shorten the length of delivery (Hemminki et al., 2011; Klaus et al., 1986). However, why this occurred only in the regional hospital and no improvements in the other MBR outcomes were found is unknown. Perhaps at the regional hospital, midwives were better trained, better supported by management and colleagues, and therefore more committed to labor support having more time to devote to it. Why the other MBR outcomes remained unchanged might relate to the weakness of the training and organization. System-level barriers may also be a factor.

Our study has plenty of strengths, including high response rates, comparisons made before and after intervention, the inclusion of control hospitals, and a relatively large number of participants. That we could link the survey data with the MBR and study the effect of the intervention on childbirth outcomes is also of great value. Moreover, the quality of the MBR was found to be high for the variables used in this study (Gissler et al., 1995; Kipnis, 2013). This is the first time a study like this has been conducted in Finland. Moreover, using three Finnish universities, two regional hospitals, and one central hospital with similar patient numbers enabled participation across different regions of Finland.

One limitation of our study might be the system-level barriers, such as the lack of structured office procedures, clinical support and supervision (Bayrampour et al., 2018), staffing levels, continuity of care, and organizational leadership (Cramer & Hunter, 2019). The time used for on-the-job training and intervention-level support in our study was adequate, but seemingly insufficient resources were allocated to the intervention because of a heavy workload and other commitments. Therefore, more intensive training events, full support of management, adequate resources, and midwives' total commitment to the training are needed.

Furthermore, a longer-term follow-up would have shown whether the intervention has changed the practices permanently. However, the 6-month period between the surveys should have offered enough time to discover the possible changes. The number of mothers recruited and participating in the surveys was reasonable. The response rate for the post-survey was poorer than the pre-survey but was still at a reasonable level. Although the response rate of the pre-survey was almost 70%, there were differences in the socio-economic background and age of the respondents. However, the differences were considered in the analyses and did not affect the results.

Of course, mere chance may explain the results of improved outcomes. However, the changes were monitored in intervention and control hospitals and adjusted for confounders in the logistic regression. Recall bias can affect how mothers evaluated their birth experience and received support. However, this should not cause differences in maternal experiences between intervention and control hospitals.

Conclusion

In conclusion, although this short on-the-job training did not increase the labor support received at the delivery ward, breastfeeding support increased. A longer follow-up is needed to show whether such an intervention can change breastfeeding practices permanently. Similarly, longer, more effective, and better maintained training as well as full support of management and adequate resources would be necessary to increase the labor support provided. All these are also needed to confirm that different outcomes can be improved with different kinds of support. In this study, specific groups of mothers received more support. Particularly, single mothers, mothers with less education, and primiparous mothers need more support. Their childbirth outcomes might improve with appropriate interventions in maternity wards. In the future, research on system-level limitations impacting provision of labor supported by midwives is needed.

CRediT authorship contribution statement

Pirjo Koski: Writing – review & editing. **Eija Raussi-Lehto:** Writing – review & editing. **Päivi Leskinen:** Formal analysis. **Reija Klemetti:** Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We thank Mr Johannes Kosonen form Sopoken Oy, Mr Valtteri Kaartemo from Englnanniksi. fi, and Lingsoft for linguistic assistencen.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2024.103936.

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