

Midwives' Management during the Second Stage of Labor in Relation to Second-Degree Tears—An Experimental Study

Malin Edqvist, RNM, Ingegerd Hildingsson, RNM, Margareta Mollberg, RNM, PhD, Ingela Lundgren, RNM, and Helena Lindgren, RNM

ABSTRACT: Introduction: Most women who give birth for the first time experience some form of perineal trauma. Second-degree tears contribute to long-term consequences for women and are a risk factor for occult anal sphincter injuries. The objective of this study was to evaluate a multifaceted midwifery intervention designed to reduce second-degree tears among primiparous women. **Methods:** An experimental cohort study where a multifaceted intervention consisting of 1) spontaneous pushing, 2) all birth positions with flexibility in the sacro-iliac joints, and 3) a two-step head-to-body delivery was compared with standard care. Crude and Adjusted OR (95% CI) were calculated between the intervention and the standard care group, for the various explanatory variables. **Results:** A total of 597 primiparous women participated in the study, 296 in the intervention group and 301 in the standard care group. The prevalence of second-degree tears was lower in the intervention group: [Adj. OR 0.53 (95% CI 0.33–0.84)]. A low prevalence of episiotomy was found in both groups (1.7 and 3.0%). The prevalence of epidural analgesia was 61.1 percent. Despite the high use of epidural analgesia, the midwives in the intervention group managed to use the intervention. **Conclusion:** It is possible to reduce second-degree tears among primiparous women with the use of a multifaceted midwifery intervention without increasing the prevalence of episiotomy. Furthermore, the intervention is possible to employ in larger maternity wards with midwives caring for women with both low- and high-risk pregnancies. (BIRTH 44:1 March 2017)

Key words: birth position, midwifery intervention, second-degree tears, spontaneous pushing, two-step delivery

The majority of women sustain some form of perineal trauma during childbirth (1) and primiparous women are more likely to suffer from severe injuries and

second-degree tears (1,2). Since most research has focused on severe perineal trauma affecting the anal sphincter complex less attention has been paid to other

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types of perineal injuries. Significantly more women experience intense perineal pain after a second-degree tear or an episiotomy compared with an intact perineum or a first-degree tear (3,4). Perineal and vaginal tears that involve muscles and the rectovaginal fascia contribute to sexual dysfunction (5,6), and are associated with an increased risk of symptomatic pelvic organ prolapse later in life (7,8), and of rectocele in particular (9). Furthermore, injuries affecting the anal sphincter are sometimes wrongly classified as second-degree tears and therefore not diagnosed and sutured correctly (10,11). Finding ways to prevent second-degree tears is of paramount importance.

A slow and controlled birth of the baby is thought to be of importance to prevent perineal trauma and midwives use different techniques to obtain the same. It has been hypothesized that spontaneous pushing will reduce perineal trauma (12), but as of yet there is no evidence for this (13,14). However, none of the studies have compared directed versus spontaneous pushing during the active second stage when the baby is born.

The protective measures supported by evidence so far are the use of hot compresses, birthing the baby's head at the end of a contraction or between contractions, and avoidance of the lithotomy position for birth (15–18). Despite this, the semi-recumbent and the lithotomy position for birth are widely used in obstetric practice (17,19).

Birth positions are often defined as either upright or supine (19). Alternatively they can be defined as flexible sacrum positions where weight is taken off the sacrum, thereby allowing the pelvic outlet to expand (20). Birth positions with flexibility in the sacro-iliac joints are as follows: kneeling, standing, all-fours, lateral position, and giving birth on the birth seat. Settings where the midwifery care includes spontaneous pushing and letting the woman choose her position for birth (21) have been associated with fewer perineal injuries (22,23).

It might be suggested that a combination of techniques rather than one single technique would be effective in preventing perineal injuries. Hitherto, different midwifery methods such as spontaneous pushing, birth positions, and other preventive approaches have been evaluated in different study arms (15) but not in multifaceted interventions integrating several methods. Moreover, giving birth is a profound experience which carries significant meaning for the woman and her family (24). The intervention in this study is based on a theoretical framework of woman-centered care which involves creating a reciprocal relationship with the woman through presence and participation during labor and birth (25,26). This is facilitated in the intervention by the use of spontaneous pushing, flexible sacrum positions, and birthing the baby's head and body in two contractions.

The aim of this study was to evaluate a multifaceted intervention created to reduce second-degree tears among primiparous women.

Methods

This is a prospective cohort study with an experimental design where an intervention is compared with standard care. The study was conducted at two maternity wards in Stockholm. Maternity ward 1 provides care to approximately 6,500 women/year whereas maternity ward 2 cares for approximately 4,100 women/year. Both wards provide care to women with low- and high-risk pregnancies.

The primary outcome was perineal injuries, classified as second-degree tears according to international standards (27), in addition using a new Swedish classification where vaginal tears with a measured depth of > 0.5 cm are considered second-degree tears (28) because of the probability of a fascia defect. Secondary outcomes were the prevalence of no tear at all, severe perineal trauma affecting the anal sphincter complex, episiotomy, and the ability of the midwives in the intervention group to use the intervention.

Second-degree tears are not registered in the national birth register in Sweden but examination of the local database of births for one of the maternity wards in this project revealed that 77 percent of the primiparous women had a vaginal and/or perineal injury, which is in line with previously reported prevalence (1,29). A pretrial power calculation based on the assumption that the intervention would reduce second-degree tears by 15 percent compared with standard care, indicated that at least 242 women were needed in each group to reach a statistical power of 80 percent at a 95 percent significance level (α). To ensure that enough participants were recruited to the study and taking dropouts into account, an additional 20 percent generated 291 women in each group.

The study included nulliparous Swedish-speaking women, gestational age $\geq 37 + 0$ weeks with spontaneous onset of labor or induction of labor. Cases of nulliparous women with diabetes mellitus (manifest or pregnancy-induced), preterm birth $\leq 37 + 0$, intrauterine growth restriction, female genital mutilation, multiple pregnancy, fetus in breech presentation, and stillbirths were excluded.

During the study period 1,773 nulliparous women fulfilled the study criteria (Fig. 1). The midwives were asked to write down their reasons for not including women in the study but most often forgot to do so. Reasons given for not asking women to participate were high workload, women not speaking Swedish

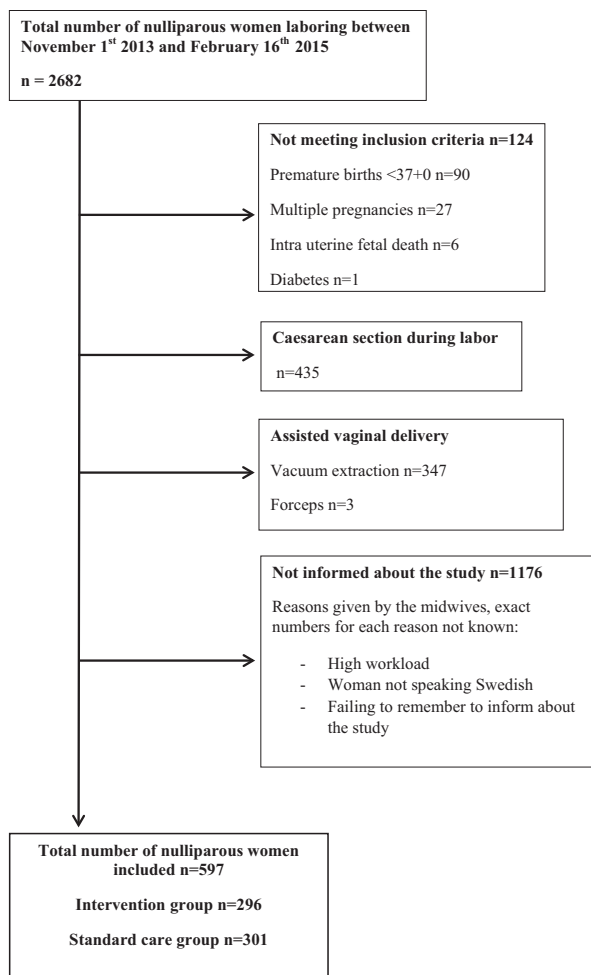


Fig. 1. Flow chart of the inclusion process in an intervention study to minimize second-degree tears during labor, Stockholm, Sweden, 2013–2015.

(exclusion criterion), and failing to remember to ask women to participate.

The intervention is based on a theoretical framework of woman-centered care (26) which consists of three parts (listed below) and is referred to as the MIMA model of care (an abbreviation for Midwives' Management during the second stage of labor). The midwives in the intervention group were asked to use all three parts of the intervention during the second stage in all births they attended.

1. Spontaneous pushing: The woman feels a strong urge to push and follows the urge but does not put on any extra abdominal pressure. The midwife will if needed assist the woman to accomplish a controlled and slow birth of the baby by encouraging breathing and resisting the urge to push during the last contractions (30).
2. Flexible sacrum positions: Birth positions with flexibility in the sacro-iliac joints, thereby enabling the

pelvic outlet to expand (kneeling, standing, all-fours, lateral position, and giving birth on the birth seat) (20).

3. Using the two-step principle of head-to-body birthing technique if possible (18). With this technique, the head is born at the end of a contraction or between contractions and the shoulders are born with the next contraction.

Standard care during the second stage of labor is sparsely recorded by midwives in Sweden and there are no national guidelines about birth position, pushing methods, or whether certain methods of manual perineal protection should be performed. Hence, the management of the second stage of labor depends on the assisting midwife's experience, knowledge, and preferences. The assumption derived from reviewing research and clinical experience is that standard care for primiparous women consists mostly of directed pushing and semi-recumbent birth positions (17). Furthermore, midwives often prefer to assist the woman to birth the baby's head and shoulders in one contraction because of fear of endangering the child (31).

Implementation of the Study

Educational sessions with all midwives on how to measure the tears and how to complete the study protocol were held before the start of the study. After this initial phase, midwives were recruited to the intervention group and had further training on how to perform the intervention. To avoid contamination between the groups and dilution of the intervention, midwives working day shift at one maternity ward were asked to perform the intervention and midwives working night shift asked to continue with standard care. In the other ward this was reversed. In maternity ward 1, 76 percent (35/46) of the midwives working day shift agreed to participate in the intervention group, whereas in maternity ward 2, 85 percent (17/20) of the midwives working night shift agreed to participate. Midwives in the standard care group received no additional information.

Data Collection

The data collection lasted from November 1, 2013 to June 16, 2014 in maternity ward 1, and from April 7, 2014 to February 16, 2015 in maternity ward 2. Women who met the inclusion criteria were asked to participate in the study when admitted to the maternity ward. They received information about the study, but

were blinded as to whether they received the intervention or not. This was considered possible since none of the parts of the intervention are new in midwifery care. Midwives in both groups measured the perineum and the tear after the birth together with a colleague (midwife, obstetrician, or auxiliary nurse) with a sterile measure stick marked in centimeters.

The midwives completed a study protocol containing questions about labor variables and midwifery techniques used during birth. The variables documented in the protocol were as follows: time when the woman was fully dilated, the use of oxytocin, pushing technique, presentation, different methods of perineal protection, the use of hot compresses, oil/lubricant, digital stretching, surveillance of the perineum, birth position, concerns about fetal health, and whether the two-step principle of head-to-body birth was practiced or not. The measurements of the tears were further classified by the first author as no tear, labial tear only, first-degree tear, second-degree tear, and severe perineal trauma affecting the anal sphincter complex. Vaginal tears with a depth of < 0.5 cm were classified as first-degree tears and vaginal tears with a depth of > 0.5 cm were classified as second-degree tears since they are likely to involve the rectovaginal fascia, an important support structure between the vaginal wall and the rectum (9). The measurements together with descriptions of the tear and follow-up questions in the protocol about assessment and suturing of the tear made the classification possible (Table 4). To ensure the validity of the classifications, meetings were held with two uro-gynecologists to discuss a selected number of protocols.

The following variables were retrieved from the hospitals local database: age, marital status, tobacco use, body mass index (BMI), assisted pregnancy and psychiatric illness, pain relief, time of labor onset, time when active second stage started, time when the baby was born, postpartum bleeding, and assessment of the tear at discharge. Variables retrieved regarding the baby were birthweight, head circumference, and Apgar scores. As the health-related problems were so uncommon in both groups they were turned into a composite variable including all health-related problems (Table 1). Continuous variables categorized were: age (< 25 years, 25–35 years, > 35 years), BMI (< 18.5, 18.5–24.9, 25.0–29.9, > 30), and postpartum bleeding (< 500 mL, 500–1,000 mL, > 1,000 mL).

Time variables were calculated between time of birth and the start of the passive second stage, and time of birth and the start of the active second stage. Passive second stage was categorized into the following: <1 hour, 1–2 hours, and > 2 hours, and active second stage into: < 30 minutes, 30–60 minutes, and > 60 minutes. Birth positions were dichotomized into

Table 1. Socio-Demographic Characteristics of Women Participating in an Intervention Study to Minimize Second-Degree Tears during Labor, Stockholm, Sweden, 2013–2015

	<i>Intervention group</i> N = 296 n (%)	<i>Standard care group</i> N = 301 n (%)
Age groups (years)		
< 25	65 (22.0)	40 (13.3)*
25–35	208 (70.5)	232 (77.3)
> 35	22 (7.5)	28 (9.3)
Married/cohabiting	263 (98.5)	253 (98.8)
Tobacco use	13 (4.7)	3 (1.1)*
BMI groups		
< 18.5	9 (3.3)	14 (5.0)
18.5–24.9	199 (72.1)	218 (77.9)
25.0–29.9	56 (20.3)	35 (12.5)*
> 30.0	12 (4.3)	13 (4.6)
Health-related problems before/during pregnancy [†]	31 (11.0)	35 (12.2)
Assisted pregnancy (IVF/ICSI)	17 (5.8)	14 (4.7)
Psychiatric problems (anxiety, depression, etc.)	25 (8.4)	35 (11.6)

[†]Composite variable including asthma, thrombosis, chronic kidney disease, endocrine diseases, diabetes, epilepsy, chronic hypertension.
*p < 0.05.

flexible and nonflexible sacrum positions. Pushing methods, surveillance of the perineum, and concerns about fetal health were dichotomized. A variable was created to analyze the primary outcome in which second-degree tears were compared with minor injuries including no tear, labial tears, and first-degree tears. The three parts of the intervention were analyzed both separately and as a composite variable (MIMA model of care). This variable includes the cases where the midwives were able to perform all parts of the intervention during the entire active second stage.

Statistical Methods and Analysis

The data were analyzed according to intention-to-treat analysis and descriptive statistics were used to present the data. Crude and Adjusted Odds ratios with a 95% confidence interval were calculated between women who received the intervention and those who received standard care, for the various explanatory variables. To study any association between the primary outcome (second-degree tears) and the identified risk factors, a stepwise multivariate regression modeling was performed. First, all statistically significant

variables from the univariate analysis were entered one by one (age, BMI, and midwives' working experience). Thereafter, previously known risk factors for perineal trauma (birthweight > 4,000 g, use of oxytocin, and the length of the active second stage) were entered. The IBM SPSS software package version 22.0 was used for the data analysis. The study was approved by the Ethics committee in Stockholm no. 2013/859-3/2.

Results

In this intervention study, a total of 597 nulliparous women participated: 296 in the intervention group and 301 in the standard care group. The two groups of women were fairly well balanced except that women in the intervention group were slightly younger and had a higher BMI (Table 1) and there were no differences with regard to obstetric variables such as labor onset, augmentation with oxytocin, and epidural analgesia, which was 61.1 percent in both groups (Table 2). The duration of the passive second stage differed between the groups, and was significantly shorter for the women in the intervention group. However, the majority of the women gave birth within 2 hours in both groups and there were no differences about the active second stage of labor. The Apgar scores did not differ between the groups and there were no babies with an Apgar score of < 5 at 5 minutes.

The working experience of the midwives differed between the groups. The group that performed standard care consisted of more newly qualified midwives, 41 percent compared with 23.1 percent, and there were more experienced midwives (> 10 years) in the intervention group, 38.7 percent versus 27.8 percent ($p \leq 0.001$).

The midwives in the intervention group used the techniques included in the MIMA model of care to a significantly greater extent than those in the control group even if spontaneous pushing, flexible sacrum positions, and the two-step head-to-body birthing technique were also used in the standard care group (Table 3). When all of the three different parts of the MIMA model of care were assessed as a composite variable this combined approach was only used by 5.7 percent in the standard care group compared with 18.0 percent ($p \leq 0.001$) in the intervention group (Table 3).

Other midwifery techniques during the active second stage, such as digital stretching of the perineum and directed pushing, were not used as frequently in the intervention group as in the control group. All the midwives in this study performed manual perineal protection in some form, but the methods used varied (Table 4) and did not affect the outcome.

Table 2. Obstetric and Birth Characteristics of Women Participating in an Intervention Study to Minimize Second-Degree Tears during Labor, Stockholm, Sweden, 2013–2015

	<i>Intervention group</i> N = 296 n (%)	<i>Standard care group</i> N = 301 n (%)
Induction of labor	41 (13.9)	48 (15.9)
Pain relief [†]		
Immersion in water/shower	63 (21.4)	56 (18.7)
Acupuncture	25 (8.5)	29 (9.7)
Sterile water injections	17 (5.8)	20 (6.7)
Nitrous oxide	247 (83.7)	260 (86.7)
Epidural analgesia	181 (61.1)	184 (61.1)
Pudendal nerve block	19 (6.4)	24 (8.0)
Augmentation with oxytocin during labor	162 (55.1)	178 (59.1)
Passive second stage		
< 1 hours	127 (46.0)	146 (50.9)
1–2 hours	84 (30.4)	61 (21.6)*
> 2 hours	65 (23.6)	79 (27.5)
Active second stage		
< 30 minutes	149 (51.9)	154 (52.0)
30–60 minutes	103 (35.9)	107 (36.1)
> 60 minutes	35 (11.9)	35 (11.8)
Midwife concerned about fetal [‡] health	88 (29.8)	73 (24.3)
Birth position		
Sitting	53 (18.0)	80 (26.7)
Kneeling	33 (11.2)	23 (7.7)*
Lateral	61 (20.7)	56 (18.7)
All-fours	20 (6.8)	11 (3.7)*
Lithotomy/recumbent	41 (13.9)	45 (15.0)
Birth chair/squatting	87 (29.5)	85 (28.3)
Presentation		
Occiput anterior	289 (98.0)	287 (95.7)
Occiput posterior	6 (2.0)	13 (4.3)
Birth weight, g (mean)	3,482	3,521
Head circumference, cm (mean)	34.7	34.8

[†]Ref = Women not exposed to the variable being studied. [‡]The midwife had worries regarding the baby's heartbeat/electronic fetal monitoring tracings during the second stage. * $p < 0.05$.

The percentage of women in the intervention group who suffered a second-degree tear (70.7%) was lower than in the standard care group (78.3%) (Table 5). The prevalence of episiotomies was low in both groups (1.7 and 3.0%) and the prevalence of severe perineal trauma affecting the anal sphincter muscles did not differ significantly between the two groups (3.7 and 4.7%). The factors included in the stepwise

Table 3. Components of the MIMA Model of Care Used by the Midwives' in an Intervention Study to Minimize Second-Degree Tears during Labor, Stockholm, Sweden, 2013–2015

	Intervention group N = 296 (%)	Standard care group N = 301 (%)	Crude OR (95% CI)
Components and composite variable for the MIMA model of care			
Spontaneous pushing	122 (41.6)	94 (31.2)	1.57 (1.12–2.20)*
Flexible sacrum position	202 (68.2)	175 (58.3)	1.55 (1.11–2.16)*
Two-step principle of head-to-body birth	142 (48.5)	97 (32.9)	1.92 (1.38–2.68)**
The MIMA model of care [†]	53 (18.0)	17 (5.7)	3.65 (2.06–6.46)**

[†]The MIMA model of care is a composite variable of the use of all the three parts of the intervention during the entire second stage. *p < 0.05, **p < 0.001.

Table 4. Care of the Perineum and Manual Support Techniques Used by the Midwives' in an Intervention Study to Minimize Second-Degree Tears during Labor, Stockholm, Sweden, 2013–2015

	Intervention group N = 296 (%)	Standard care group N = 300 (%)	Crude OR (95% CI)
Care of the perineum			
Good surveillance of the perineum	231 (79.7)	225 (75.5)	1.28 (0.86–1.88)
Warm compresses on the perineum	251 (92.6)	265 (91.1)	1.24 (0.67–2.27)
Massaging the vagina and perineum with lubricant or oil	114 (41.9)	135 (46.4)	0.83 (0.60–1.16)
Manual stretching of the perineum	41 (15.1)	86 (29.6)	0.42 (0.28–0.64)**
Manual perineal support[†]			
Manual perineal support	178 (61.0)	146 (47.5)	0.71 (0.51–0.98)*
One hand on the baby's head	94 (32.2)	53 (18.0)	2.17 (1.47–3.19)**
Ritgens maneuver [†]	28 (9.6)	24 (8.1)	1.20 (0.68–2.12)
Supporting the birth of the shoulders	154 (52.7)	148 (50.2)	1.11 (0.80–1.53)

[†]Ritgens maneuver = The fetal chin is reached for between the anus and the coccyx and pulled anteriorly, while using the fingers of the other hand on the fetal occiput to control speed of delivery and keep flexion of the fetal neck. [‡]Ref = Women not exposed to the variable being studied. *p < 0.05, **p < 0.001.

logistic regression model did not alter the protective-ness of the intervention (Adj. OR 0.53 [95% CI 0.33–0.84]) (Table 5).

Discussion

The use of the MIMA model of care reduced the prevalence of second-degree tears among primiparous women in this study. This is important for women as perineal and vaginal tears are associated with dyspareunia (5), lower levels of vaginal arousal and orgasm (6), and pelvic organ prolapse later in life (7,8), all factors that have an influence on women's quality of life.

An important finding in this study is the low prevalence of episiotomy in both groups and in the intervention group in particular. Since an episiotomy involves the same perineal muscles as a second-degree tear (32), an increased prevalence of episiotomy would counteract the reduction in second-degree tears seen in this study. Furthermore, there is a consensus

that a restrictive episiotomy policy is beneficial to women (33). Many obstetric units in the Nordic countries have introduced a multifactorial protective intervention developed in Finland to reduce severe perineal trauma (34). The MIMA model of care and the Finnish intervention are both multifaceted interventions based on the same assumption: that a slow expulsion of the baby's head will protect the woman from tearing during birth. However, the Finnish intervention differs from the MIMA model as it focuses on the use of a specific hands-on perineal protection technique, and recommends episiotomy if indicated (30). One of the concerns raised about the Finnish intervention is the increased prevalence of episiotomies at the maternity wards where the intervention is employed (34).

The midwives in the intervention group used all parts of the intervention to a greater extent than the midwives in the standard care group but total use of the intervention during the entire active second stage may be considered as low. Even though most of the

Table 5. Perineal Tears and Postpartum Bleeding of Women Participating in an Intervention Study to Minimize Second-Degree Tears during Labor, Stockholm, Sweden, 2013–2015

	<i>Intervention group</i> N = 296 (%)	<i>Standard care group</i> N = 301 (%)	<i>Adjusted OR[†] (95% CI)</i>
Perineal trauma			
Second-degree tear (primary outcome)	208 (70.7)	234 (78.3)	0.53 (0.33–0.84)*
Minor injury (no tear, labia, first degree)	75 (25.5)	51 (17.1)	
Assessment of tear at discharge			
Sore/swollen	13 (4.4)	16 (5.3)	NA
Hematoma	3 (1.0)	1 (0.3)	NA
Postpartum bleeding			
< 500 mL	219 (76.3)	218 (75.5)	0.90 (0.59–1.39)
500–1,000 mL	58 (20.3)	60 (20.8)	1.18 (0.74–1.86)
> 1,000 mL	10 (3.5)	11 (3.8)	NA

[†]Adjusted for midwives' working experience, age, BMI, birthweight > 4,000 g, augmentation with oxytocin, and active second stage. NA = not applicable. *p < 0.05.

midwives agreed to participate in the intervention group many of them voiced concerns, particularly their fear of endangering the baby if the two-step head-to-body birthing technique were to be used (31). The midwives associated the different parts of the intervention with practices used in the home birth setting (35) where no medical pain relief is available. Some of them questioned whether it was possible to facilitate spontaneous pushing in a setting where most nulliparous women use epidural analgesia for pain relief. One barrier reported to affect adherence to interventions is lack of applicability because of the clinical situation—in this case, the high use of epidurals (36). Research about implementation shows that using local opinion leaders and feedback helps to improve performance (37). Reflective meetings were held with the midwives in the intervention group but in retrospect, identification and extended education of local opinion leaders could have helped the midwives deal with what they perceived as difficult.

When comparing the working experience of the two groups, it turned out that the midwives in the intervention group were more experienced on average than those in the control group. It is not known if longer working experience of a midwife is a protective factor for perineal trauma. Results from a recent study suggest that the midwife's individual performance is a predictive factor for the occurrence of second-degree tears but unfortunately the study does not report on working experience (38). It could be argued that an experienced midwife would be more able to prevent perineal trauma but this need not be so given that longer experience in previous practice is a known barrier to adherence (39), possibly making experienced midwives less receptive to new concepts or guidelines. However, adjusting for

the differences in working experience did not alter the protectiveness of the intervention.

The experimental design, the detailed study protocol with midwifery measures during the second stage of birth, and the measuring of the tear after birth are the major strengths of this study. The study design also deals with the problem of contamination and dilution of the intervention when performed by midwives at the same maternity ward, and the possibility of different working cultures between midwives working day or night shift. Furthermore, the MIMA model of care is multifaceted and takes into account the fact that women's expectations, wishes, and labors may differ, thus enabling the midwife to provide woman-centered care (26).

While a reduced prevalence of second-degree tears was observed in this study, a causal relationship between the MIMA model of care and the prevention of tears cannot be established since this is an experimental study with a potential risk of bias. Not all eligible nulliparous women were recruited to the study. However, both the intervention and the standard care group were similar with regard to labor onset and obstetric variables, and the differences in maternal characteristics were adjusted for in the final analysis.

Another limitation is that it was not possible to perform an extensive analysis of the women not included in the study since the primary outcome and the midwifery techniques used during labor and birth are not registered in the database. Ethical regulations restrict the possibility of retrieving data from individual records on women not enrolled in the study. Furthermore, ethnicity is not registered in the registers of birth and therefore it is not possible to analyze any effect of

ethnicity. However, the most common countries of birth for female Swedish citizens born outside Sweden are presently Finland, Poland, Iran, and Syria (40), and to the best of our knowledge none of the groups from these countries are considered to be at higher risk of suffering perineal trauma.

Given the limitations of the study, the results should be interpreted with some caution. To further establish the effectiveness of the MIMA model of care it should be evaluated in a randomized cluster trial, including maternity wards of different sizes and in rural and urban areas.

Conclusion

The use of the MIMA model of care reduced the incidence of second-degree tears among primiparous women. The intervention does not seem to cause any harm as it does not increase severe perineal trauma or unwanted interventions such as episiotomy. Nor does it restrict women's choice of position for birth. Furthermore, the intervention is possible to use in larger maternity wards with midwives caring for women with both low- and high-risk pregnancies.

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