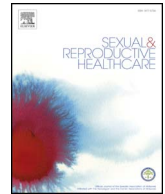




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Practices used by midwives during the second stage of labor to facilitate birth – Are they related to perineal trauma?



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Introduction

The second stage of labor is considered to be the most stressful part of the process of childbirth for the woman and her unborn child, and consequently for the midwife [1]. Guidelines give upper time limits for passive descent and active pushing [2,3] during the second stage because of adverse maternal and neonatal outcomes for women with a prolonged second stage [4]. The clinical recommendation in Sweden for the management of the second stage is delayed pushing [3], which means encouraging women who are fully dilated but do not have the urge to push to rest and wait until there is a strong urge to push, or when the fetal head becomes visible at the vaginal introitus [5].

The advantages or disadvantages of directed, or spontaneous pushing during the second stage have been debated for a long time [6]. Directed pushing, also known as the Valsalva technique, is a method where the woman is encouraged to take a deep breath at the beginning of the contraction, to hold this breath and to push as long and hard as she can in synchrony with her contractions [7]. Suggested disadvantages with the use of directed pushing are higher rates of fetal acidosis, maternal exhaustion, and pelvic floor impairment [8,9] but the evidence for either method is still inconclusive [5]. Epidural analgesia may decrease the spontaneous urge to bear down and is associated with prolonged second stage [10] and midwives mention epidural analgesia as a reason for conducting directed pushing [11].

There are several practices that midwives use in combination with directed pushing to enhance maternal bearing-down efforts, and to ascertain the progress during the second stage: digital stretching of the vagina or the perineum, vaginal examinations where pressure is applied to the spinae ischiadica to stimulate Ferguson's reflex, and stretching of the perineum [12,13]. Digital stretching of the vagina is often referred to as levator pressure in Sweden. The aim of digital stretching of the perineum is either to prevent perineal injuries or to try to manually relax a rigid or tight perineum. To stretch the perineum, one or two fingers are inserted between the emerging head and the perineum. The midwife stretches the perineum by stroking her fingers laterally from

side to side. In addition, two other approaches with the aim of facilitating effective pushing and assessing progress in the second stage are used, the towel trick and manipulation of the symphysis pubis. The towel trick is used to increase the woman's bearing down efforts, where the midwife and the woman (who usually adopts the lithotomy or sitting position), pull a sheet in opposite directions during contractions. It is used instead of using a rope or a birth sling for bearing down when the sling is not available in the birthing room or if the woman is too tired. Manipulation of the symphysis pubis is used when it is difficult for the baby's head to pass under the symphysis pubis. The midwife inserts her fingers in the vagina under the pubic arch and presses upwards during one or several contractions. There is no evidence so far that the different methods midwives use during the second stage are associated with perineal trauma but anecdotal evidence suggests that they may contribute to tearing [14]. However, a practice that has been associated with severe perineal trauma is fundal pressure [15]. Its use is discouraged [16] but findings from a Swedish study show that it was used in 11% of the assisted vaginal births [17]. Fundal pressure during the second stage of labor involves application of manual pressure to the upper part of the uterus directed towards the birth canal, in an attempt to assist spontaneous vaginal birth and avoid prolonged second stage or the need for operative birth [18]. Upright birth positions seem to reduce the length of the second stage of labor [19], which could affect the use of different midwifery techniques used by midwives during this part of labor. However, there is no evidence so far that upright or supine birth positions result in higher incidence of perineal trauma [19]. To what extent directed pushing and other practices to facilitate birth are used by midwives in Sweden is not known.

The aim of this study was to describe different methods used by midwives during the second stage of labor in order to facilitate birth and to investigate whether these methods were associated with perineal trauma.

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Methods

Data from an experimental prospective cohort study conducted at two maternity wards with approximately 6500 births/year and 4000 births/year in Stockholm were used for this report. The experimental cohort study compared an intervention during the second stage with the aim of reducing second-degree tears to standard care at the two maternity wards [20]. The intervention study consisted of two parts. Since standard care during the second stage of labor is sparsely recorded by midwives a baseline measurement at the two maternity wards was conducted before the start of the interventional part of the study. For the purpose of the present study the data analyzed consists of questionnaires completed by the midwives after the birth from the baseline measurement and from the standard care group in the interventional part of the study. The outcome of the interventional part of the study has been previously described [20].

The study included nulliparous Swedish-speaking women with a live singleton pregnancy, vertex presentation, and gestational age $\geq 37 + 0$ weeks with spontaneous onset of labor or induction of labor. Exclusion criteria were women with diabetes mellitus (manifest or pregnancy-induced), intrauterine growth restriction, and female genital mutilation. Women with assisted vaginal births were excluded.

Data collection

The data collection regarding the baseline measurement lasted from 2nd September 2013 to 31st October 2013 at maternity ward 1. At maternity ward 2 the baseline measurement lasted from 28th October to 29th March 2014. During this period, 403 out of 744 nulliparous women at the two wards were included in the study. The interventional part of the study was conducted at maternity ward 1 from 1st of November 2013 – 1st June 2014 and at maternity ward 2 from 7th April 2014 – 16th February 2015. During this period 886 nulliparous women were eligible for inclusion in the standard care group and 301 of the women were enrolled in the study. In total 704 out of 1630 eligible women were included in the present study (43.2%).

After the birth, the midwives measured the tear and the perineum together with a colleague using a sterile measure stick marked in cm. The measurements and the methods used during the second stage of labor were recorded in a study questionnaire. The questionnaire consisted of predefined questions and the variables documented in the questionnaire were: time when the woman's cervix was fully dilated, the use of oxytocin, fetal presentation, different methods used to facilitate birth, practices used during the second stage, positions used during the second stage, and birth position. Further, the midwives could add their own descriptions if other methods were used than those predefined in the questionnaire. 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 [20].

The following maternal 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 the active second stage started, time when the baby was born, postpartum bleeding, and assessment of the tear at discharge. All health-related problems were turned into a composite variable. They included asthma, chronic kidney disease, endocrine diseases, and epilepsy (Table 1). Variables retrieved regarding the baby were birth weight, head circumference and Apgar scores at 1, 5 and 10 min. Continuous variables categorized were: age (< 25 years, 25–35 years, > 35 years), BMI (< 18.5, 18.5–24.9, 25.0–30.0, > 30.0), and postpartum bleeding (< 500 ml, 500–1000 ml, > 1000 ml). Time variables were calculated between time of birth and the start of the passive second stage, and between time of birth and the start of the active second stage. Passive second stage was categorized into the following: < 1 h, 1–2 h, and > 2 h, and active second stage into: < 30

Table 1
Socio-demographic background.

	Total N = 704 n (%)
Age, mean (SD)	29.7 (4.45)
Age groups (years)	
< 25	115 (16.5)
25–35	514 (73.6)
> 35	69 (9.9)
Married/cohabiting	696 (99.0)
Tobacco use	12 (1.8)
BMI groups	
< 18.5	31 (4.8)
18.5–24.9	489 (75.3)
25.0–30.0	97 (14.9)
> 30.0	32 (4.9)
Health-related problems before/during pregnancy ^a	88 (13.1)
Assisted pregnancy (IVF/ICSI)	32 (4.5)
Psychiatric problems (anxiety, depression, etc.)	77 (11.5)

^a Composite variable including asthma, chronic kidney disease, endocrine diseases, epilepsy, chronic hypertension.

min, 30–60 min, and > 60 min.

Statistical methods and analysis

Descriptive statistics were used to present the background characteristics. The outcome variables were second-degree tears (including vaginal tears with a depth > 0.5 cm), and severe perineal trauma affecting the anal sphincter muscle complex according to international and new national guidelines [21,22]. The outcome variable second-degree tear was dichotomized (yes/no), in which “no” consisted of minor injuries (including no tear, labial tears and first-degree tears, and where vaginal tears with a depth < 0.5 cm were included). The second outcome variable severe perineal trauma was dichotomized (yes/no), in which “no” consisted of minor injuries and second-degree tears. Odds ratios with a 95% confidence interval were calculated between the outcome variables and the different techniques used by the midwives during the second stage. To further assess whether any of the techniques were associated with perineal injuries logistic regression modeling was performed using a model with known risk factors for perineal trauma found in previous research (birth weight > 4000 g, use of oxytocin, and the length of the active second stage) [23,24]. For all analyses, two-sided p-values < 0.05 were considered significant and 95% confidence intervals (CI) were used to describe the precision of the estimates. The IBM SPSS software package version 22.0 was employed for the data analysis.

This study was approved by the Ethics committee in Stockholm no 2013/859-3/2. Women received both written and oral information regarding the study from the attending midwife at the delivery ward. They were told that it was possible to withdraw their consent at any time without any consequences regarding care during birth and the postnatal period.

Results

A total of 704 primiparous women participated in this study, 403 from the baseline measurement and 301 from the standard care group in the interventional part of the study. Few women in this study were smokers (1.8%) and almost all were cohabiting or married (99.0%) (Table 1). In total, 59.5% of the women used epidural analgesia for pain relief. The incidence of women who had their labor augmented with oxytocin was 58.3%. The majority of the women had a passive second stage that lasted less than one hour (49.7%) (Table 2) but for 11.6% of the women the passive second stage lasted for more than three hours. A prolonged active second stage of more than 60 min occurred in 12.4% of the women (Table 2). The majority of the midwives had over

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