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Comparison of lateral episiotomy, traditional midwifery without episiotomy, and hands-off techniques delivery on pelvic floor function

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A B S T R A C T

Background: Prolonged vaginal delivery times and episiotomy are associated with damage to the muscles of the pelvic floor, and with complications that include postpartum sexual dysfunction and urinary stress incontinence. This study was to compare the pelvic floor function among postpartum women who underwent three midwifery practices during labor: lateral episiotomy, traditional midwifery without episiotomy, and hands-off techniques delivery.

Methods: We included 320 primipara who were full-term pregnancy and underwent vaginal delivery in Department of Obstetrics, Peking University People's Hospital, China. 117 women had episiotomy during labor and were classified into the lateral episiotomy group; 103 had traditional midwifery without episiotomy and were classified into the traditional midwifery practice group; and 100 experienced hands-off techniques during labor and were classified into the hands-off techniques delivery group. The duration of the second stage of labor, and postpartum pelvic floor muscle strength were compared between the three study groups.

Results: There were no significant differences between the three groups for the duration of the second stage of labor and postpartum pelvic floor muscle strength ($P > 0.05$). However, the incidence of postpartum urinary stress incontinence and sexual dysfunction in the hands-off techniques delivery group was significantly lower than in the lateral episiotomy groups and the traditional midwifery practice group ($P < 0.01$).

Conclusions: Hands-off techniques delivery could reduce damage to the pelvic floor and improve the quality of life for women after delivery.

1. Introduction

Pregnancy, labor, and delivery are normal physiological processes for women. However, pregnancy and labor have a significant impact on the structure of the pelvic floor of women. During vaginal delivery, the pelvic floor tissue will undergo stretching, causing postpartum structural and functional changes [1]. Delivery is one of the main causes of pelvic floor dysfunction [2]. Changes in pelvic floor muscle strength may affect the lower urinary tract and sexual function, which may impair the postpartum quality of life for women.

The role of the midwife is to help women to complete labor with good prognosis for both maternal and fetal, which may be supported by modern interventions to ensure maternal and fetal safety [3]. In China, there has been little evidence from clinical studies to determine whether the type of midwifery practice is beneficial to the function of the pelvic floor and outcome for both the mother and infant.

Therefore, this study aimed to compare the effects of three midwifery practices including lateral episiotomy, traditional midwifery without episiotomy, and hands-off techniques delivery on pelvic floor muscle strength, urinary stress incontinence, postpartum sexual function to identify the optimal midwifery practice in China.

2. Methods

2.1. Study participants

This study included 320 women who completed vaginal delivery from January 2017 to December 2018. The study inclusion criteria were primipara with single pregnancies who delivered at full-term, and who were able to provide informed consent. The study exclusion criteria were fetal macrosomia, maternal history of chronic disease, vaginitis, urinary tract infections or previous pelvic surgery. The study was approved by the Ethics Committee of Peking University People's hospital (2013–33). The study was conducted to guarantee anonymity, with the prior approval of each participants, and with the expressed consent for the scientific use of the information. Informed consent and publication agreement were

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obtained from all the patients recruited.

2.2. Midwifery practice groupings

Women who had vaginal deliveries (n = 320) included those in the lateral episiotomy group (n = 117), the traditional midwifery practice group (n = 103), and the hands-off techniques delivery group (n = 100). The age, neonatal birthweight and duration of the second stage of labor were compared between the three study groups.

The traditional midwifery practice group included women who experienced the traditional delivery method at our unit. Before delivery, the midwife spoke with the mother to improve patient compliance. When the cervix was dilated, the woman was in a semi-sitting position with her legs wide apart and her feet in the stirrups. The midwife stood in front of the woman to deliver the baby. After the fetal head crowned to between 4 and 5 cm, the midwife gently assisted the fetal head with her left hand to control the speed of delivery. The midwife had her right elbow supported on the delivery table and the thenar eminence of her right hand placed on the perineal body to protect the perineum, with four fingers interlocked to support the buttocks. The right hand of the midwife did not leave the perineal body until the baby was delivered.

In the lateral episiotomy group, the episiotomy was performed when the midwife evaluated that the baby would be delivered after one or two contractions, with the remaining steps being the same as for the traditional midwifery practice group.

In the hands-off delivery group, after the fetal head crowned to between 4 and 5 cm, the midwife used one hand to control the speed of delivery of the head without supporting the perineal body. The midwife carefully observed the expansion of the perineal body and instructed the woman in labor to push slowly between the contractions and to exhale and relax during the contraction. After the fetal head was delivered, the midwife waited for the fetal head to retract naturally. When the woman in labor breathed again, the midwife gently pressed down on the infant's neck with one hand to deliver the front shoulder. The midwife then held the head and neck of the infant by her right hand and held the body of the infant by the left hand. After the shoulders and the body were delivered, the remaining steps were the same as for the traditional midwifery practice group.

2.3. Evaluation methods

Postpartum pelvic floor muscle strength was evaluated at the 42-day postpartum examination. Pelvic floor muscle strength of all women from the three groups were measured using the PHENIX Neuromuscular Electrical Stimulation Therapy System (Guangzhou, China). The pelvic floor muscle strength was classified according to the proportion of TypeImuscle fibers and TypeIImuscle fibers. According to the international pelvic floor muscle strength test method (GRRUG method), the muscle strength index displayed by the pelvic floor function therapeutic apparatus was divided into 0,I,II,III,IV, andVgrade, in which the pelvic floor muscle strength of less than grade III was considered to indicate impaired muscle strength.

Postpartum urinary stress incontinence was evaluated at the 42-day postpartum examination. Any involuntary leakage of urine after cough, sneeze, laugh, exercise, or change in body position was diagnosed as urinary stress incontinence.

Postpartum sexual dysfunction was evaluated at a 6-month postpartum telephone follow-up. A postpartum sexual dysfunction rating scale was used to evaluate postpartum sexual dysfunction in the three groups, including sexual fantasy, sexual desire, sexual conversations, initiation of sexual behavior, reaction to the sexual proposal of spouse, orgasm, frequency of intercourse, rating of the quality of sex life, and pain during intercourse, with total score of between 0 and 100 points. A score of <60 points with a pelvic floor muscle strength of < grade III indicated postpartum sexual dysfunction.

2.4. Statistical analysis

Data were analyzed using SPSS version 21.0 (IBM, Chicago, IL, USA) and the chi-squared (χ [2]) test. Data with a normal distribution were analyzed using analysis of variance (ANOVA) and the least significant difference (LSD) test. Data with a non-normal distribution were compared using the Kruskal–Wallis test and the rank-sum test. A *P*-value <0.05 considered to be statistically significant.

3. Results

3.1. Comparison of the age of the women and neonatal birthweight and duration of the second stage of labor among three groups

The mean age of the 320 women was 30.68 ± 3.236 years. The mean birthweight was 3267.28 ± 427.054 g. The mean duration of the second stage of labor was 48.42 ± 30.268 min. There were no significant differences among the three study groups ($P > 0.05$), which supported that they were comparable (Table 1).

3.2. Comparison of pelvic muscle strength, urinary stress incontinence, and sexual dysfunction among the three groups

Comparison of the detection rate of abnormal pelvic floor muscle strength, urinary stress incontinence, and sexual dysfunction among three groups shows that there were no significant differences in the gradeIandII impaired muscle among the three study groups. The rate of postpartum urinary stress incontinence and sexual dysfunction in the hands-off techniques midwifery practice group was significantly lower than that in the lateral episiotomy group (P = 0.007; P = 0.001). (Table 2).

4. Discussion

The pelvic floor consists of muscles, ligaments, fascia, and nerves which maintain the integrity of the pelvic outlet and ensure urinary continence. The organs in the pelvic cavity include the urethra, bladder, uterus, fallopian tubes, vagina, and rectum, which rely on the pelvic floor tissue to maintain their normal anatomical positions. During vaginal delivery, the pelvic floor muscles are overstretched to 2.17 times the maximum length of normal pelvic floor muscles [1]. When the soft birth canal and the surrounding pelvic floor tissue are extremely dilated, the pelvic floor nerves, muscles, fascia, and ligaments will be impaired and may rupture [4]. The varying degrees of impairment, which might be reversible or irreversible, can result in structural and functional changes to the pelvic floor that lead to dysfunction of the pelvic floor [5].

The second stage of labor is accompanied by the most intense pressure on the tissue of the pelvic floor [6]. Previous studies have shown that increased duration of the second stage of labor could significantly increase the risk of the structural and functional impairment to the pelvic floor muscles [2,7]. The findings from the present study showed that there was no statistical difference in the duration of the second stage of labor among three groups and the mean duration of the second stage was 48.42 ± 30.2 min. Hands-off techniques in midwifery practice did not increase the duration of the second stage of labor without episiotomy, and this may be a more natural form of childbirth.

According to the characteristics of the pelvic floor muscle contraction, the muscles can be divided into TypeIand TypeIImuscle fibers. TypeImuscle fibers mainly exist in the deep layers of levator ani muscles, and their physiological functions include tonic contractions and sustained contractions that are enduring and unlikely to cause muscle fatigue. TypeIImuscle fibers mainly exist in the superficial layers of perineal muscles, and their physiological functions include intermittent contractions, which are fast but tend to cause muscle fatigue. This study showed that there were no significant differences among the three groups in the impairment rate of TypeIand TypeIImuscle fibers (both, P > 0.05),

Table 1
Maternal age, neonatal birth weight and duration of the second stage of labor in three study groups.

	Lateral episiotomy group (n = 117)	Traditional midwifery without episiotomy group (n = 103)	Hands-off techniques delivery group (n = 100)	t	*P*-value
Age (years)	30.74 ± 3.161	30.70 ± 3.143	30.61 ± 3.236	0.042	0.959
Neonatal birthweight (g)	3267.61 ± 453.168	3281.55 ± 366.795	3252.20 ± 456.038	0.119	0.888
Duration of the second stage of labor (min)	47.94 ± 27.557	53.74 ± 36.798	43.49 ± 24.757	2.967	0.053

Table 2
Comparison of postpartum urinary stress incontinence and sexual dysfunction among three groups n (%).

	Lateral episiotomy group (n = 117)	Traditional midwifery without episiotomy group (n = 103)	hands-off techniques delivery group (n = 100)	$\chi 2$	*P*-value
GradeIimpaired muscle	47 (40.2)	40 (38.8)	37 (37.0)	0.229	0.892
GradeIIimpaired muscle	6 (5.1)	8 (7.8)	1 (1.0)	5.281	0.071
Stress incontinence	41 (35.0)*	24 (23.3)	17 (17.0)*	9.640	0.008
Sexual dysfunction	54 (46.2)*	40 (38.8)	23 (23.0)*	12.800	0.002

Comparison of the rate of stress incontinence between the lateral episiotomy group and the hands-off techniques midwifery practice group: $\chi 2 = 3.030$; $P = 0.007$. Comparison of rate of postpartum sexual dysfunction between the lateral episiotomy group and the hands-off techniques delivery group: $\chi 2 = 3.525$; $P = 0.001$.

indicating that the three midwifery practices had almost the same effects on the pelvic floor muscle strength. However, a higher proportion of TypeImuscle fibers were impaired than TypeIImuscle fibers, which may be explained by the fact that the volume and weight of the uterus would increase gradually after pregnancy, and the pelvic floor muscles would therefore be continuously stressed due to the influence of postpartum hormones [8], leading to greater impairment of TypeImuscle fibers.

The results of this study showed that the incidence of urinary stress incontinence in the hands-off techniques midwifery practice group was significantly lower than in the lateral episiotomy group ($P < 0.05$). The finding that hands-off techniques reduced the risk of postpartum urinary stress incontinence may be explained by the minimal use of episiotomy in this group. The bulbospongiosus muscle, the ischiocavernosus muscle, and the deep vaginal muscles and nerves can be impaired after lateral episiotomy, resulting in urinary stress incontinence [9]. In the hands-off technique group, the midwife's hands will not routinely press against the perineal body, thus reducing the risks of edema and muscle impairment caused by continuous compression. Also, moderate control of the speed of delivery of the infant during childbirth would prevent perineal laceration caused by the uneven pressure in the vagina, which can reduce the risk of urinary stress incontinence [10,11]. Previous studies have shown that the incidence of postpartum urinary incontinence can be as high as 30%−60% [12]. Although hands-off technique can reduce the incidence of stress incontinence, it cannot be completely avoided because of the inevitable impact of vaginal delivery on the pelvic floor muscles. The rate of delivery of the infant disrupts the balance between the surrounding forces supporting the urinary tract. Therefore, it is necessary to actively perform functional training of the pelvic floor muscles after childbirth, and nurses should also provide health education on this for postpartum women.

A systematic review of the literature showed that the mode of delivery in primiparous women in China was an important factor in changes to the pelvic floor that were associated with postpartum sexual dysfunction [13]. Obstetric factors that may lead to muscle relaxation in the vaginal wall and the pelvic floor may impair female sexual function [14,15]. This study showed that the incidence of postpartum sexual dysfunction in the hands-off techniques group was lower than that in the lateral episiotomy group ($P < 0.01$), but there was no significant difference between the hands-off techniques group and the traditional midwifery practice group. These findings indicate that lateral episiotomy may disrupt the integrity of the perineum and impair the important structures closely associated with female sexual function. Also, the large area of scar tissue caused by lateral episiotomy could impair sexual function to a certain degree [16]. In the hands-off techniques group and the traditional midwifery practice group, the continuity of the perineum was not disrupted. In addition, this postpartum sexual dysfunction survey also has limitations. Several factors also affect postpartum sexual dysfunction including the number of deliveries, breastfeeding, type of delivery, episiotomy, fatigue, and physical and psychological dysfunction including postpartum depression [17]. But what we need to take into consideration is that celibacy could cause many issues other than the pelvic floor-vaginal lubrication, lack of sleep and or desire. This remind us that comprehensive evaluation should be considered when using the questionnaire in future research.

With the increasing awareness of reproductive health care in developing countries, pregnant women and their families are paying more attention to the choice of delivery methods [18,19]. The World Health Organization issued a new guidance in Geneva on February 15, 2018, recommending the reduction of unnecessary medical interventions for healthy pregnant women. The lateral episiotomy incision artificially caused perineal damage, and it did not reduce the pain and perineal damage of the parturient. On the contrary, it caused postpartum problems such as wound healing difficulties, rectal injury and perineal scar re-injury. The hands-off techniques delivery can reduce the intervention of human factors to a certain extent, and strengthen the cooperation and cooperation between pregnant women and fetuses [20]. It can greatly reduce the damage to the mother's body, help protect the integrity of the perineum, and reduce the discomfort such as pain, swelling, etc. Also, it can reduce the risk of neonatal asphyxia, improve pregnancy outcomes, ensure the safety of mothers and babies, make it easier for mothers to accept, and have higher satisfaction [21]. Therefore, the clinical application and promotion of the hands-off techniques delivery can be carried out in the future, while paying attention to the exact effect and long-term impact of the technology.

4.1. *Strengths and limitations*

This study is to compare the outcomes of pelvic floor function of three midwifery practices, lateral episiotomy, traditional midwifery without episiotomy, and hands-off techniques delivery. Hands-off techniques methods of midwifery practice would reduce damage to the pelvic floor, improve the quality of life for women after delivery and provide guidance for midwives when using birthing techniques. Yet there remains some limitations. The long-term outcomes of infant and maternal were not observed and more research needs to be done.

5. Conclusions and implications for practice

This study compared three midwifery practices, lateral episiotomy, traditional midwifery without episiotomy, and hands-off techniques

delivery at an academic obstetric unit. The findings showed that delivery without episiotomy reduced the incidence of postpartum urinary stress incontinence, postpartum sexual dysfunction, and reduced impairment to pelvic floor function, which improved the quality of life for women following delivery. These findings support those from international studies and meta-analysis data. In conclusion, women experience normal vaginal delivery would benefit from non-interventional practice in midwifery care and should be widely promoted.

Author contributions

The authors' responsibilities were as follows -Gong J: designed the study, collected and analyzed data and drafted the manuscript; Xing L: collected data; Li X: designed the study, analyzed data and critically revised the manuscript; Wang X: collected data; Chen H:revised the manuscript.

Declaration of competing interest

No conflict of interest exits in the submission of this manuscript, and manuscript is approved by all authors for publication. I would like to declare on behalf of my co-authors that the work described was original research that has not been published previously, and not under consideration for publication elsewhere, in whole or in part. All the authors listed have approved the manuscript that is enclosed.

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