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Associations between improved care during the second stage of labour and maternal and neonatal health outcomes in a rural hospital in Bangladesh

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ABSTRACT

Objective: To evaluate the efficacy of care in the second stage of labour with a package of interventions that included (1) maintaining the birthing position according to the woman's choice, (2) adopting a spontaneous pushing technique and (3) using a support person, to reduce maternal and neonatal complications.
Design: Used the data collected from two cohorts- before and after an initiative to improve care during the second stage of labour.
Setting: A rural hospital in Bangladesh where 90–100 deliveries are conducted monthly and cesarean section provision is not available.
Participants: One thousand and fifty-one singleton pregnancies who attended the hospital for giving birth in the first stage of labour before full dilatation of the cervix and with cephalic presentation.
Measurements and findings: Data were collected through a structured checklist and questionnaire completed by research assistants; and also retrieved from hospital case record files, and the ongoing demographic surveillance system database. Coverage of adopting the upright or lateral position in the post-intervention period increased to 76% from about 1% in the pre-intervention period, and the spontaneous pushing technique increased to 97% from 77% in the same period. The odds of combined maternal and neonatal complications decreased by 46% between pre- and post-intervention periods (odds ratio: 0.54, 95% confidence interval: 0.43–0.70). Frequency of episiotomy (from 43% to 29%, $P < 0.001$), cervical tear (3.8% to 1.5%, $P = 0.02$), and median blood loss (200 ml to 150 ml; $P < 0.001$) were reduced significantly in the same period. No significant associations were observed in perineal tear or birth asphyxia occurrences.
Key conclusions and implications for practice: The study suggests that there is a beneficial effect of care during the second stage of labour with a package of interventions in reducing maternal and neonatal complications, particularly in reducing the frequency of episiotomy, cervical tear, and blood loss during delivery. The preferred choice of posture during giving birth, adopting a spontaneous pushing technique and continuous presence of support person during the second stage of labour may be encouraged for better health outcomes.

Introduction

The second stage of labour (SSL), defined as the period from full dilation of the cervix to delivery of the baby, is a physiologic process but also a critical window during childbirth (Altman and Lydon-Rochelle, 2006). Potential complications that may appear during that period include fetal hypoxemia and acidemia leading to birth asphyxia, obstructed labour due to failure to an appropriate descent of the presenting part, and other life-threatening complications in women with pre-existing illnesses. Professionals have agreed upon on the care practices in the first and third stages of labour, including care of neonates immediately after childbirth. However, the initiative to achieve a consensus on guidelines for SSL care has been relatively neglected. Yet, appropriate practicing of the available interventions for SSL care is suggested to prevent maternal and newborn complications (FIGO, 2012).

Care in the SSL relies on several components in addition to monitoring of vital signs, such as the position at labour, the pushing technique, and the presence of a support person to help the woman giving birth and the attending health care provider. Women prefer to use different positions when in labour if there are no restrictions (Carlson et al., 1986; Shilling et al., 2004); these are broadly categorized into dorsal, upright and lateral positions (Gupta and Nikodem, 2003; Keen et al., 2004). The limited evidence available so far suggests that adopting an upright

Abbreviations: SSL, Second stage of labour; HDSS, Health and Demographic Surveillance System; LMP, Last menstrual period; PPH, Post-partum hemorrhage.

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or lateral position has advantages over the dorsal position in reducing several maternal and neonatal complications. The upright positions result in less discomfort and difficulty in bearing down; less labour pain; less perineal or vaginal trauma; and fewer wound infections (Gupta et al., 2009). Studies also have reported less frequent abnormal heart rate patterns, and less frequent low Apgar scores in neonates of women who used upright positions compared to women adopting dorsal positions (de Jong et al., 1997; Gupta and Nikodem, 2000; Roberts, 2002). In a few trials, it was found that blood losses were greater in women who used birthing chairs to give birth (Crowley et al., 1991; Gupta and Nikodem, 2000). In the lateral position, slowly descent of the fetal head may prevent lacerations and thereby reduce the need for episiotomy, and enable women to have more control over her pushing (Difranco et al., 2007). A few studies found that oxygenation of the fetus is better when women labour or give birth on their side rather than in dorsal position (Gupta et al., 2009; Stremler et al., 2005).

During the SSL, compression occurs in the bladder and rectum after descent of the presenting part of the fetus, which causes an intense reflex to bear down and is usually referred to as 'push' (Lemos et al., 2015). The pushing stage occurs after the cervix is fully dilated and it facilitates the journey of the baby from the uterus and down through the birth canal to delivery. Out of two types of pushing techniques, spontaneous pushing is more comfortable for a mother, whereas directed pushing is difficult, forceful and tiring (Lemos et al., 2015). Studies have reported that spontaneous pushing of the fetus protects maternal tissues and improves perineal outcomes by lowering the number of episiotomies performed and lacerations to cervix and perineum in comparison to the directed pushing technique (Righard, 2001; Roberts and Woolley, 1996; Roberts et al., 1987). Directed pushing is associated with fetal heart rate changes that suggest fetal hypoxia and acidosis at birth (Roberts et al., 1987) and increased incidence of birthing by use of forceps and perineal trauma (Lemos et al., 2015; Roberts, 2002).

Having the right support person during labour can help make the birth a better experience by providing emotional support, comfort measures, information, and advocacy. The supportive care may augment labour progress, as well as improve women's feelings of well-being and capability, resulting in reduced medical and surgical interventions (Hodnett et al., 2013; WHO, 1996). Continuous support by nurses, midwives, lay people or female relatives is associated with reductions in cesarean section rates, operative vaginal delivery, use of intra-partum analgesia and birth asphyxia (Hodnett et al., 2013). The presence of a confident, experienced and expert support person continuously during birthing can relieve pain, enhance labour, improve outcomes and increase the satisfaction of the pregnant woman (Simkin, 2001).

Studies available so far have suggested advantages from practicing the individual care components during the SSL on preventing adverse health outcomes. However, to our knowledge, there is lack of studies evaluating a package of interventions, including supportive care during the SSL. There is also lack of studies from low-income countries including Bangladesh. To address these issues, the present study evaluated data collected from two cohorts, before and after an effort to improve care during the SSL with an intervention package that included maintaining the birthing position according to the woman's choice, adopting a spontaneous pushing technique and using a support person to reduce maternal and neonatal complications in a rural hospital in Matlab, Bangladesh.

Methods

Study site, design, and participants

The study area is located in Matlab, a sub-district under Chandpur district, in Bangladesh. International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) has implemented a Health and Demographic Surveillance System (HDSS) in Matlab and collects vital events such as marriage, birth, death and migration (in and out) through bi-monthly home visits of locally recruited female community health workers. In addition, they identify pregnant woman during their routine household visits. In one half of the HDSS area, icddr,b provides health care to women of reproductive age and their children under five years of age. The area has four administrative blocks; each block has a sub-center, where midwives provide 24-h maternal and child health care. One hospital, located in Matlab town, supports these sub-centers to manage patients referred from the community or sub-center levels. The Matlab Hospital has a maternity unit where 90–100 deliveries are conducted per month, but cesarean section is not available (Pervin et al., 2012; Rahman et al., 2011).

The present study, conducted during 2014–2015, was based on prospectively collected data from two cohorts - before and after initiation of an effort to improve the care in the SSL with a package of interventions that included (1) maintaining birthing position according to the woman's choice, (2) adopting spontaneous pushing technique and (3) using a support person during birthing. The study participants were women with singleton pregnancies who attended the Matlab Hospital for birthing in the first stage of labour before full dilatation with cephalic presentation and provided consent for participation in the study. We excluded women with multiple pregnancies, presenting positions other than cephalic, who attended the hospital with full dilatation and all referred cases.

Improve care during the second stage of labour and its implementation process

The present study took advantage of the ongoing efforts to improve maternal, neonatal and child health care in the Matlab Hospital. In 2007–2009, a Maternal, Neonatal and Child Health (MNCH) project was initiated that strengthened the uptake of evidence-based maternal and neonatal health interventions along the continuum from pregnancy through post-partum periods (Rahman et al., 2011). In addition to facilitating evidence-based interventions, the MNCH project also ensured improved birthing care at different stages of labour. However, supportive care in the SSL such as birthing position according to women's choices, spontaneous pushing techniques, and the support person's engagement during birthing, was not persistently practiced. Acknowledging this gap, the Matlab Hospital took an initiative to improve care in the SSL.

All physicians and nurses or midwives involved with delivery care in the Matlab Hospital were trained for a month in group of three to four staff members. They were trained in different birthing positions, pushing techniques and the importance of involvement of a support person during birthing. The clinical staff was also trained on how to counsel the support person and pregnant mother about birthing positions, timing with the process of pushing techniques, and advantages and disadvantages of these procedures. In addition, they received information on different types of comfort measures such as backrubs, how to assist when changing positions and walking around, and offering fluids or drinks to birthing women. During the intervention phase, the clinical staff counseled on and demonstrated different birthing positions, pushing techniques and the importance of support person involvement. Women were then allowed to choose their preferred position and pushing technique for birthing.

Data collection

We collected the data prospectively, before and after the intervention, through multiple sources – (1) by observing the birthing women, (2) by interviewing the mother after the birth, and also (3) by retrieving information from hospital case record files and the HDSS database. Research assistants, using a structured checklist, collected information on intervention coverage and the support person's role on providing comfort measures through observation of the birthing women; additional information was gathered from a postpartum maternal interview. The research assistants also retrieved information on relevant clinical