Nonpharmacological Interventions During Childbirth

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NURS 6286: Introduction to Foundations of Healthcare Informatics

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March 19, 2023

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Pain during childbirth is described as a harrowing and exhausting female experience, both physically and psychologically. The physiological pain manifests through ischemic, uterine contractions, effacement, cervical dilation, and pelvic compression (Beyable et al., 2022). Uncontrolled pain during labor increases respiratory rate and may induce hyperventilation, which can lead to respiratory alkalosis and decreases blood flow to the fetus. Additionally, pain can increase the release of catecholamines and cortisol, which can cause maternal and fetal complications (Beyable et al., 2022). Women's perception of pain during childbirth is closely aligned with physiological and psychological dimensions, including knowledge, education, and experience (Li et al., 2020).

Knowledge

Although pain-reducing interventions have evolved, pharmacological measures are not without risk (DiTomasso, 2019). Due to the physiological risks to the laboring woman and her fetus, nonpharmacological interventions (NPI) to reduce pain in childbirth are chosen by many women and widely supported in research and systematic reviews of the literature (Beyable et al., 2022; Biana et al., 2021; DiTomasso, 2019; Li et al., 2020). NPI include massage, relaxation, ambulation, re-positioning, emotional support, use of ergonomic devices, breathing techniques, and water births, and are associated with shorter laboring stages and fewer caesarian sections (DiTomasso, 2019). NPI use during labor may also increase maternal satisfaction, enhance the emotional and spiritual aspects of childbirth, and shorten hospital stays (Biana et al., 2021).

Information

There are four important types of information to include in an NPI-specific clinical decision support tool within the electronic health record. These are re-positioning, ambulation, breathing techniques, and massage of the laboring woman. All of these have data points to support each one.

First, the literature supports maternal positioning as an NPI that can improve birth outcomes and reduce pain (Zang et al., 2020). General classifications for birthing positions include upright and supine positions, flexible sacrum, and non-flexible sacrum positions. Flexible sacrum positions include "standing, squatting, kneeling, sitting upright, hands-and-knees," which are all techniques to remove weight or pressure from the sacrum, while lying in the supine, dorsal, or lithotomy positions are considered non-flexible (Zang et al., 2020, p. 3155). Women who labored in flexible sacrum positions, like squatting or kneeling, were less likely to experience severe pain (Familiari et al., 2023; Zang et al., 2020). A provider who promotes flexible sacrum positions during labor, which reduces the risk of severe perineal trauma, can help prevent the pain this causes during delivery and the pain that can occur for years following the trauma (Zang et al., 2020). Labor pain could be reduced with flexible sacrum positions because these positions allow women to move easily and change to a different, more comfortable body alignment (Zhao et al., 2020).

A second type of information to include in a decision support tool is ambulation during labor to decrease pain. Ambulation during the first and second stages of labor has been shown to reduce pain and duration of childbirth, which highlights the benefit of ambulation to low-risk pregnant women (Shojaei et al., 2021). Ambulation can also help the laboring woman cope with the pain of childbirth by distraction, and movement of the pelvic bones and gravity can move the baby down the birthing canal.

A third type of information to include in a decision support tool are breathing techniques during labor for pain management. When a woman is fearful and anxious regarding labor and the pain she may experience, her body will activate the sympathetic nervous system. With this activation, stress hormones are released, vasoconstriction takes place, and cortisol is released in excess (Vural & Aslan, 2019). Increasing circulating cortisol levels can decrease oxytocin secretion and prolong labor, thus extending the duration of labor-related pain. Breathing calms the laboring woman and induces a more comfortable labor experience, in addition to increasing oxygen circulating through the blood, which benefits the mother and fetus (Vural and Aslan, 2019). Having some control, such as breathing, increases the mother's self-confidence, decreases fear, prevents the excessive release of cortisol, and decreases pain (Vural & Aslan (2019).

Massage during labor is another type of information to reduce pain. Massage is a simple and inexpensive pain-reducing method, which can be taught during pregnancy and applied by the partner, to provide comfort to the laboring woman. Massage can relax muscles, increase blood circulation and feelings of comfort, thereby reducing stress symptoms and pain. During massage, endorphins and enkephalins, natural painkillers that reduce pain and improve mood, are released. The results of massage are lower reports of pain, labor duration, and Apgar scores (Biana et al., 2021).

Data Elements

Data elements to support informational interventions are pain level, respiratory rate, heart rate, blood pressure, duration of labor, Bishop and Apgar scores, anxiety levels, and maternal satisfaction. Pain severity scales are a structured data element and can initiate NPI information in a clinical decision support tool such as the re-positioning of the laboring woman. Expression of

pain can also be unstructured data if entered into the electronic health record as a narrative description of observation such as grimacing, severity, and type of pain.

Additionally, elevated heart rate and blood pressure readings are structured data elements that can indicate pain and trigger NPI interventions such as breathing techniques. Duration of labor stages is another example of structured data. Long labors can increase pain and risk of maternal and fetal complications.

Bishop scores are structured data elements and NPI can increase these scores at time of admission. Higher Bishop scores are a decisive predictive factor for spontaneous delivery or successful induction. Furthermore, Apgar scores, another structured data element, can improve using information interventions, as noted in the literature (Vural & Aslan (2019).

Intentional breathing awareness allows for slowed respirations, as a rapid respiratory rate can lead to hyperventilation, representing a structured data element and an indicator of pain. Subjective Units of Distress Scale (SUDS) is used to assess childbirth fear at the beginning and end of each stage of labor and is a structured data element. SUDS rates emotional discomfort on an 11-point scale (Vural & Aslan, 2019), and can be used to support the information on breathing techniques in labor.

Maternal satisfaction can be both structured and unstructured data. A rating scale from zero to ten can be added as a structured data element. On the other hand, a narrative description of a woman's childbirth experience can be written into the electronic health record.

Clinical Decision Support Tool

An exhaustive review of the literature produced eleven clinical guidelines to support an uncomplicated delivery (Zhao et al., 2020). However, a clinical decision support tool (CDS) for obstetric providers specific to NPI during childbirth was not evident in the literature review. A

clinical decision support tool to help guide maternal care delivery, without pharmacological measures, could efficiently and effectively provide pain relief, improve the childbirth experience, and potentially reduce maternal-fetal complications. A related CDS tool regarding noncancer chronic pain in a primary care setting was identified, and can be applied to different specialties, such as Obstetrics. This study by Apathy et al., (2022), implemented a CDS known as OneSheet in order to examine its functionality and real-world usage through a retrospective analysis. OneSheet allows providers to complete guideline-required opioid mitigation tasks such as examine previous and current treatments, potential alternate treatments, and patient reported-pain. Once the information was entered, the tool helped providers choose treatments, opioid or nonopioid, while balancing risks and patient goals. The results saw a wide range of provider use and suggested that CDS use varied in utility across practitioners (Apathy et al., 2022).

A CDS, such as the one used by Apathy et al., (2022), could also be implemented to allow providers to enter data and aggregate various nonpharmacologic pain interventions during labor. Development, integration, and implementation of an NPI-specific decision support tool within an electronic health record would likely be supported by the American College of Obstetricians and Gynecologists (ACOG), which produces and endorses clinical practice guidelines for providers and educational materials for patients. ACOG recommends limiting interventions during childbirth ("ACOG Committee Opinion No. 766: Approaches to Limit Intervention During Labor and Birth," 2019), and states NPIs do not adversely affect labor progression or maternal or fetal health. Additionally, obstetric providers should consider NPIs for low-risk spontaneous labor to improve the childbirth experience and decrease risks to the woman and fetus ("ACOG Committee Opinion No. 766: Approaches to Limit Intervention During Labor and Birth," 2019).

Due to the unique emotional, physical, and mental experience of childbirth, a shared decision-making support tool, focused on NPI, could increase maternal satisfaction. Within this tool, the use of information, guided by data elements, could effectively decrease labor pain (Annandale et al., 2022). This patient-centered tool could guide providers and women to choose different methods of NPI, noted as information, when certain data elements, such as pain scores, heart rates, and respiratory rates fluctuate during labor.

Conclusion

In conclusion, using NPI during childbirth can reduce pain and maternal and fetal complications. A clinical decision support tool within the electronic health record could assist providers in promoting and implementing interventions supportive to the laboring woman and would improve the experience of childbirth, using shared decision-making. The support tool could include information such as re-positioning, ambulation, breathing techniques, and massage, measured by structured and unstructured data elements, such as respiratory rate, heart rate, blood pressure readings, pain level, Bishop and Apgar scores, anxiety levels, maternal satisfaction, and duration of labor.

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