Largest study of its kind of women in labor finds nitrous oxide safe, side effects rare

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Researchers at the University of Colorado College of Nursing and the School of Medicine Department of Anesthesiology at the Anschutz Medical Campus found that the use of nitrous oxide (N_2O) as a pain relief option for individuals in labor is safe for newborn children and laboring individual, and converting to a different form of pain relief such as an epidural or opioid is influenced by a woman's prior birth history and other factors.

The study, out today in *Journal of Midwifery & Women's Health*, surveyed 463 women who used nitrous oxide during labor. The study is the largest and first of its kind in the United States to report rates of side effects from N2O use during labor, as well as reasons for women in labor after cesarean to convert to other forms of pain relief. Of the women who began using N2O as an initial pain relief technique, 31% used only N2O throughout labor and 69% transitioned to another pain relief method such as epidural and/or opioids. "Nitrous oxide is a useful, safe option for labor analgesia in the United States. And for some laboring mothers, that's all the pain relief they need. Understanding predictors of conversion from inhaled nitrous oxide to other forms of analgesia may assist providers in their discussions with women about pain relief options during labor," said lead author and Associate Professor with the University of Colorado College of Nursing Priscilla M. Nodine, Ph.D., CNM.

The reason most often cited (96%) for converting from N2O to an alternative therapy was inadequate pain relief. The odds of conversion

from N2O increased approximately 3-fold when labor was augmented with oxytocin and when labor was induced. Also, those who had a history ofcesarean section and experienced labor post-cesarean had more than a 6-fold increased odds of conversion to neuraxial analgesia or epidural. The odds of conversion to neuraxial analgesia decreased by 63% for individuals who had given birth previously relative to those who were giving birth for the first time.

Approximately 4 million women in the United States give birth each year, and for many, coping with laborp is a significant concern. Epidurals and spinal blocks, also known as neuraxial analgesia, are the most frequently used pain management tools in the United States, with the main alternative being systemic opioids, which can be associated with both maternal and fetal adverse effects. Recently reintroduced as a pain relief option during labor in the United States, N2O has a long history of use in many developed nations and is increasingly available in the US. "While there is a fair body of anecdotal evidence of safety and effectiveness for how nitrous oxide affects pain during labor, few systematic analyses of outcomes are available from US-based cohorts," said Nodine.

More information: Priscilla M. Nodine et al, Nitrous Oxide Use During Labor: Satisfaction, Adverse Effects, and Predictors of Conversion to Neuraxial Analgesia, *Journal of Midwifery & Women's Health* (2020). DOI: 10.1111/jmwh.13124

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