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Evidence-based guidelines for intrapartum maternal hydration assessment and management: A scoping review

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Abstract

Problem: Inconsistent practice relating to intrapartum hydration assessment and management is reported, and potential harm exists for laboring women and birthing persons.

Background: Labor and birth are physically demanding, and adequate nutrition and hydration are essential for labor progress. A lack of clear consensus on intrapartum hydration assessment and management during labor and birth currently exists. In addition, there is an inconsistent approach to managing hydration, often including a mixture of intravenous and oral fluids that are poorly monitored.

Aim: The aim of this scoping review was to identify and collate evidence-based guidelines for intrapartum hydration assessment and management of maternal hydration during labor and birth.

Methods: PubMed, Embase, and CINAHL databases were searched, in addition to professional college association websites. Inclusion criteria were intrapartum clinical guidelines in English, published in the last 10 years.

Findings: Despite searching all appropriate databases in maternity care, we were unable to identify evidence-based guidelines specific to hydration assessment and management, therefore resulting in an “empty review.” A subsequent review of general intrapartum care guidelines was undertaken. Our adapted review identified 12 guidelines, seven of which referenced the assessment and management of maternal hydration during labor and birth. Three guidelines recommend that “low-risk” women in spontaneous labor at term should hold determination over what they ingest in labor. No recommendations with respect to assessment and management of hydration for women undergoing induction of labor were found.

Discussion: Despite the increasing use of intravenous fluid as an adjunct to oral intake to maintain maternal intrapartum hydration, there is limited evidence and, subsequently, guidelines to determine best practice in this area. How hydration is assessed was also largely absent from general intrapartum care guidelines, further perpetuating potential clinical variation in this area.

Conclusion: There is an absence of guidelines specific to the assessment and management of maternal hydration during labor and birth, despite its importance in ensuring labor progress and safe care.

KEYWORDS

birth, clinical variation, fasting in labor, hydration, hyponatremia, intrapartum care, intravenous therapy, labor, labor and birth management or care

1 | INTRODUCTION

Labor and birth are physically demanding. Adequate nutrition and hydration are important mechanisms to sustain physical wellbeing, yet how best to do this during labor and birth is not well understood. The activity of the uterine smooth muscle contracting strongly every 2–3 min during active labor demands significant oxygen¹ and glucose.² Hydration is theorized to be important as uterine blood flow is not auto-regulated, and in the presence of decreased intravascular volume (which can result from significant dehydration), fluid may be redistributed away from the uterus—affecting its efficiency during labor.³ Laboring people who are not adequately hydrated may have alterations in the acid–base balance of the fluid surrounding the myometrial fibers, resulting in a decrease in the pH, which is shown to affect calcium signaling and the force of myometrial contractility, prolonging the course of labor.⁴ Midwives take responsibility for assessing maternal hydration and delivering prescribed therapies during labor and birth. In recent years, reliance on intravenous therapy (IVT) has emerged as the main hydration mechanism for laboring women, observed in studies to range from 62% to 87% of all labors.^{5,6} Intravenous therapy appears to be administered independent of maternal fasting status,⁷ and women are known to be fasted during labor, despite evidence indicating this is not necessary for low-risk women in spontaneous labor.⁸ Oral restriction practices and the subsequent reliance on IVT to maintain maternal hydration during labor and birth may be due to the historical evolution of the management of labor and birth.

In the first half of the 20th century, encouraging maternal intake of food and fluids during labor and birth was recommended.⁹ However, during the 1940s, fasting during labor emerged due to concerns about pulmonary aspiration during general anesthesia should a cesarean birth be required.¹⁰ More recently, advances in regional anesthesia and concurrent reduction in rates of general anesthesia, means routine fasting, especially for women at low risk of complications in spontaneous labor, has become less common.¹¹ Subsequently, international intrapartum guidelines now encourage oral fluid intake during labor.^{12,13}

International intrapartum care guidelines, for a positive birth experience¹² recommend that maternal hydration should be managed by way of oral fluid and food intake during labor. However, despite these recommendations, IVT for the purpose of maternal hydration during labor and birth and routine oral restriction practices persist.^{8,14} This is correlated with the increasing prevalence of medical interventions during labor and birth, which have risen markedly over the past 50 years.¹⁵ Indeed, IVT in labor, especially for nulliparous women, has become so widely used that there is potential for midwives and doctors to become unaware of the potential unintended, harmful effects that current practice may result in.¹⁶

Our previous work has highlighted that most women have a peripheral intravenous catheter inserted during labor,⁶ providing easy, ready access to IVT administration. Despite being a prescribed medication, IVT documentation occurs in the context of broad variation in practice, poor record-keeping, and incomplete fluid balance charts.¹⁷ Of particular concern, within this context, is the induction of labor in nulliparous women. Throughout Australia, IVT is administered during induction of labor, despite a state of maternal euvoemia, usually from the outset of induction of labor; however, variation is known to occur in terms of rates and rationale for administration.^{18,19} Induction of labor is known to have a much longer latent phase than spontaneous labor in nulliparous women,²⁰ thus often resulting in large volumes of IVT being administered. Serious maternal complications such as fluid overload and hyponatremia²¹ have resulted from indiscriminate IVT, and the increasing focus on encouraging habitual oral water intake has furthermore added to the problem.²² Of further concern, maternal hyponatremia is often mirrored in the newborn, and there is evidence of increased rates of respiratory distress and hyperbilirubinemia in hyponatremia infants.²³

Large-scale systematic reviews have made efforts to address the issue of intrapartum hydration management on labor outcomes, such as length of labor. Dawood and colleagues³ systematic review suggested that the administration of IVT at 250 mL/h was associated with a reduction in the duration of labor (two trials only). A more recent

systematic review (seven trials) found that IVT therapy did not reduce the duration of labor.²⁴ Notably, the control groups fasted intrapartum—a practice now discouraged by international intrapartum guidelines¹² or maternal preference¹¹ and therefore limiting applicability to current practice.

The personalized assessment and monitoring of hydration status for each woman during pregnancy, labor, and lactation has not been a feature of clinical education, despite the significant physiological challenges (expanding blood volume, increased cardiac output, increased glomerular filtration rate, and need for water retention) to balance the body's water volume during that time.²⁵ During normal pregnancy, colloid osmotic pressure decreases in the postpartum period to sometimes dangerous levels, and this decrease has been linked to the administration of intravenous crystalloid solutions. Coronary arterial oxygen capacity decreases in response to the hemodilution that occurs after the infusion of large volumes of fluid. Fluid overload has also been associated with elevated central venous pressure, increased cardiovascular work, myocardial ischemia, and pulmonary edema, and thus has the potential to significantly affect maternal outcomes.²⁶ Given that IVT during labor and birth is common as an adjunct or instead of oral fluids,²⁷ and consensus has not been reached in the scientific literature, an inconsistent approach to hydration assessment and management has been adopted.^{17,18} Arguably, maternal hydration strategies should be informed by an objective measurement of the hydration status of the woman.

Surprisingly, the clinical assessment of hydration is not taught as a holistic skill set to midwives. On examination, contemporary foundation health and medical textbooks seem to focus on different elements of hydration assessment according to discipline (nursing differs from midwifery texts) and independent body systems. The focus of nursing is on the procedural monitoring of intake and output for all patients.²⁸ While examples from midwifery texts address the lack of evidence to support the routine administration of IVT and restrictions on eating and drinking in labor²⁹ but do not address how hydration status should be assessed or monitored.

The lack of clear consensus on maternal hydration assessment during labor and birth has therefore led to an inconsistent approach to managing hydration. Contemporary practice often includes a mixture of IVT (maintenance fluids and boluses) and oral hydration, which is largely unmonitored.¹⁷ This may unintentionally expose women and their newborns to harm. In circumstances where such clinical variation exists, examining clinical practice guidelines is justified. Clinical practice guidelines (hereafter referred to as guidelines) can be defined

as “systematically developed statements to assist practitioners' decisions about appropriate health care for specific clinical circumstances”.³⁰ Guidelines are considered to decrease the gap between research and current practice and, therefore, to reduce inappropriate variability in clinical practice.³¹ Guidelines are valuable tools in situations where the scientific evidence is sparse, where multiple therapies are available, or where uncertainty in terms of treatment options exists, as in the case of intrapartum hydration assessment and management.

Ideally, the practice of both liberal IVT administration and varying fasting practices should be evidence-based. To seek a solution to the clinical variation concerns outlined and to address the current gap in knowledge and understanding, we sought to undertake a scoping review of clinical practice guidelines specific to maternal intrapartum hydration assessment and management from an international perspective. The aim of this scoping review was to identify and synthesize evidence-based guidelines for the assessment and management of intrapartum hydration during labor and birth, including spontaneous and induced onset of labor.

2 | METHODS

A scoping review of clinical practice guidelines was undertaken, consistent with the approach developed by Arksey and O'Malley.³² This type of literature review was selected as it facilitates a broad exploration of the topic, scoping a range of literature. As we sought to understand what guidance was currently informing clinical practice, this approach was highly suitable as it facilitates the mapping of topics rather than purely answering a specific intervention question.³²

2.1 | Search strategy

The bibliographic database searching followed a three-step strategy: (1) a limited, preliminary search of two databases (SCOPUS and CINAHL), which included a text analysis in the titles and abstracts of the retrieved guidelines; (2) application of the generated search terms from step-1 to all of the appropriate databases (PubMed, Embase (Elsevier), CINAHL Complete (EBSCOhost)); and (3) reference lists or citations from the included literature.³³ In addition, National and International obstetric and midwifery organization websites including but not limited to The World Health Organization (WHO), Australian and New Zealand College of Obstetrics and Gynaecology (RANZCOG), National Institute for Health and Care Excellence (NICE), International Federation of Gynecology

and Obstetrics, Society of Obstetricians and Gynaecologists of Canada, American College of Obstetricians and Gynecologists (ACOG), Society of Obstetric Medicine of Australia and New Zealand were individually searched, and a final “gray literature” search was conducted by searching internet sources with the search terms. An example search term extract is shown here:

PubMed [Includes MeSH]: ("Labor, Obstetric"[Mesh] OR "intrapartum"[ti] OR "birth"[ti] OR "labour"[ti] OR "labor"[ti]) AND ("guidelines"[ti] OR "guideline"[ti] OR "CPG"[ti] OR "CPGs"[ti] OR "consensus"[ti] OR "guidance"[ti] OR "position statement"[ti] OR "position statements"[ti] OR "recommendation"[ti] OR "recommendations"[ti] OR "best practice"[ti] OR "Guidelines as Topic"[Mesh] OR "Guideline"[Publication Type] OR "Consensus"[Mesh] OR "Consensus Development Conferences as Topic"[Mesh]) NOT ("Animals"[Mesh] NOT "Humans"[Mesh]) AND (eng[la] OR und[la]) AND 2012:2022[dp]

2.2 | Source selection and data charting

Sources were selected according to predetermined inclusion and exclusion criteria. Inclusion criteria were clinical guideline; guideline relates to normal labor and birth; guideline relates to induction of labor; and English language. These inclusion criteria were applied because the focus of the scoping review was to analyze clinical practice guidelines that should regularly incorporate management and assessment of maternal hydration. Exclusion criteria were: not a guideline; guideline relates to conditions arising during pregnancy, labor, and birth, such as gestational diabetes, pre-eclampsia, or preterm birth; and non-English. A date range of the past 10 years was set (2012–2022) to ensure only current guidelines were included. Two authors (LK, DM) independently screened all titles and abstracts of identified sources according to inclusion and exclusion criteria. Any conflicts were resolved through discussion with a third author (AC). The Preferred Reporting Items for Systematic Reviews and Meta-analysis extension for scoping reviews (PRISMA-ScR) guides the reporting in this article (see Figure 1). Because scoping reviews seek to develop a comprehensive overview of the evidence rather than a

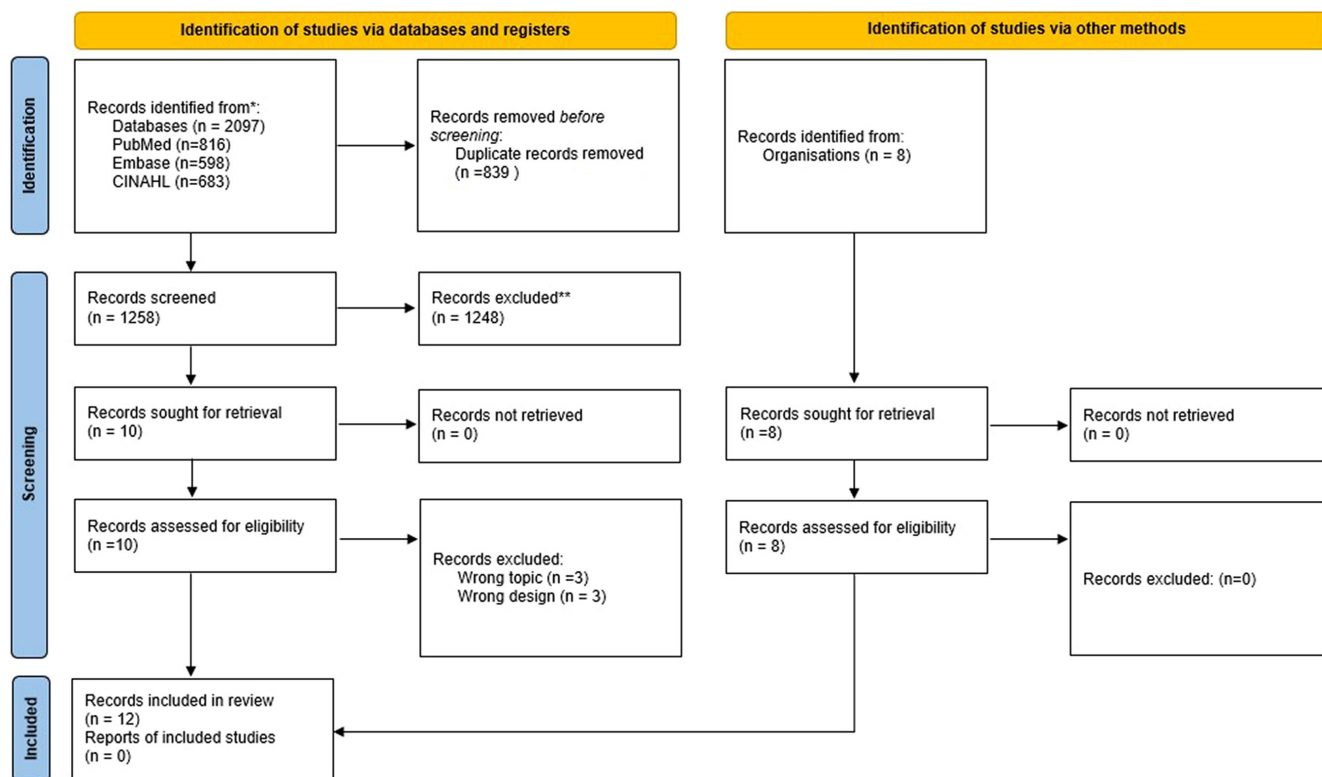


FIGURE 1 PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources. *Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/register). **If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools. From: Ref. [35] For more information, visit <http://www.prisma-statement.org/>.

quantitative or qualitative synthesis of data, it is not usually necessary to undertake methodological appraisal or risk of bias assessment of the sources.³⁴ Scoping reviews systematically identify and chart relevant literature that meets predetermined inclusion criteria available on a given topic to address specified objective(s) and review question(s) in relation to key concepts, theories, data, and evidence gaps.³⁴ In keeping with the scoping review methodology, we extracted and charted the data into predefined meaningful categories, which included: evidence source details and characteristics; the level of evidence that underpinned the recommendation; and the context within which the guideline was to be applied. Finally, the data were collated, summarized, and the results reported. The protocol was not published before the review being undertaken.

3 | RESULTS

There were 12 guidelines identified, specific to intrapartum care, which included the spontaneous and induced onset of labor. The key findings from these guidelines are summarized in [Table 1](#).

Across the six guidelines specific to *normal labor and birth*, some reference was made to maternal hydration assessment; however, most recommendations were unclear. The American College of Obstetrics and Gynecology provided the most specific guidance, stating that the assessment of urinary output and the presence or absence of ketosis can be used as clinical practices to monitor hydration.³⁶ Within the *induction of labor* guidelines, no reference across all six guidelines was made to intrapartum hydration assessment.³⁷⁻⁴¹

Maternal intrapartum hydration management was reviewed in all the extracted guidelines specific to recommendations about both oral intake and IVT. Ubiquitously across all normal labor and birth guidelines, oral clear fluid intake was supported, and some reference to food intake was made according to the woman's own preferences. However, this was less consistent and cautionary, with ACOG recommending an avoidance of food but not mentioning fluids,³⁶ with other guidelines suggesting continual assessment of intake was recommended and if a need for general anesthetic was likely, oral intake should cease.⁴² The NICE guidelines suggested that isotonic drinks may be more useful than water,⁴² but all other guidelines were non-specific in what kinds of fluids and foods should be ingested. No induction of labor guidelines provided advice on oral intake during induced labor; however, the WHO guideline on augmentation of labor recommended that oral intake be maintained.⁴⁰

Intravenous therapy guidance during normal labor and birth was addressed in four of the six guidelines.^{14,36,42,43} Routine administration of IVT was not broadly recommended

for women in spontaneous labor and was only to be considered if a variation from "normal" occurred, such as for individual clinical need.³⁶ Routine administration of IVT was not recommended as a strategy for reducing the length of labor.¹⁴ The only guideline to reference any adverse impact from the generous use of IVT was the Canadian guideline, which cautioned of a potential impact on postpartum breast edema.⁴³ Again, within the induction of labor guidelines, no reference to the administration of IVT was provided, no recommendations made, or guidance suggested.

The guidelines were also reviewed for evidence of critical appraisal of the evidence using a recognized quality appraisal tool by the guideline authors. Only the WHO intrapartum care and augmentation of labor guidelines provided this, and they identified that very low-quality evidence was available to inform the guidance pertaining to intrapartum hydration management.^{14,40}

4 | DISCUSSION

Our initial intention with this scoping review was to identify, analyze, and collate evidence-based guidelines in the peer-reviewed literature that specifically addressed clinical practice for maternal intrapartum assessment and management of hydration. Despite searching all appropriate databases in maternity care, we were unable to identify evidence-based guidelines specific to this area. This review, therefore, can be identified as an "empty review." Empty reviews are seemingly prevalent, at least in the Cochrane database. A study by Yaffe et al.⁴⁴ estimated that 1 in 10 Cochrane reviews, as of 2010, were defined as empty reviews. Historically, the publication of empty reviews has been challenging^{45,46} because they are often viewed negatively by editors, and because limited analysis has been undertaken, they offer a limited contribution to new knowledge. However, we argue that empty reviews are important and worthy of publication because they illuminate important gaps in knowledge. Once identified, this knowledge gap can be addressed by primary research studies.

As described earlier, we broadened our search strategy to pivot from the initial empty review to look within the broader intrapartum guidance for recommendations pertaining to hydration assessment and management. When "low-risk" women are in spontaneous labor at term, international established guidelines from WHO, SCOG, and ACOG^{14,36,43} are consistent with high-quality evidence⁹ that oral intake has not been found to be harmful during labor and women should hold determination over what they ingest during their labor. However, if women are induced, these guidelines do not address their hydration or nutrition needs. In fact, no guidelines about hydration assessment or management for women undergoing induction of labor were found. This raises concern.

TABLE 1 Summary of guidelines.

Recommendations about intrapartum hydration assessment and management				
Authors, year/country	Name of guideline	Hydration assessment	Hydration management	
Normal labor and birth guidelines				
The American College of Obstetricians and Gynecologists ^a , 2017/United States of America	Approaches to Limit Intervention During Labor ^a and Birth	Assessment of urinary output and the presence or absence of ketosis can be used to monitor hydration	<p>Oral intake:</p> <ul style="list-style-type: none"> Oral hydration can be encouraged to meet hydration and caloric needs. Support oral intake of moderate amounts of clear liquids by women in labor who do not have complications. Particulate-containing fluids and solid food should be avoided <p>Intravenous fluids:</p> <ul style="list-style-type: none"> Women in spontaneously progressing labor may not require routine continuous infusion of intravenous fluids. If such monitoring (as per “hydration assessment column”) indicates concern, intravenous fluids can be administered as needed If intravenous fluids are required, the solution and the infusion rate should be determined by individual clinical need and anticipated duration of labor 	Not determined
American College of Nurse-Midwives, 2016/United States of America	Providing Oral Nutrition to Women in Labor	Risk assessment during labor continues as usual; consideration of limiting oral solids and/or liquids among women with increasing risk (e.g., prolonged labor, persistent vomiting) may be indicated	<p>Oral intake:</p> <ul style="list-style-type: none"> Reaffirm pregnancy as a normal, physiological process and emphasize supportive care During antepartum care, discuss with women the very small risk of aspiration during labor and birth. Anesthesia should be identified as the causal factor that increases risk for aspiration, not oral intake, and women should be informed that if labor deviates from normal, they might be asked to refrain from solid and/or liquid intake. Promote self-determination of appropriate oral intake in healthy women experiencing normal labors. The use of epidural analgesia for intrapartum pain management in otherwise normal labor should not preclude oral intake. Risk factor guideline development is recommended to inform shared decision-making relating to oral intake <p>Intravenous fluids:</p> <ul style="list-style-type: none"> Nothing specified 	Not determined

TABLE 1 (Continued)

Authors, year/country	Name of guideline	Recommendations about intrapartum hydration assessment and management		Level of evidence
		Hydration assessment	Hydration management	
National Institute for Health and Care Excellence, 2017/United Kingdom	Intrapartum care for healthy women and babies [CG 190]	Nil	<p>Oral intake:</p> <ul style="list-style-type: none"> Inform the woman that she may drink during established labor and that isotonic drinks may be more beneficial than water. Inform the woman that she may eat a light diet in established labor unless she has received opioids, or she develops risk factors that make a general anesthetic more likely. <p>Intravenous fluids:</p> <ul style="list-style-type: none"> Preloading and maintenance fluid infusion need not be administered routinely before establishing low-dose epidural analgesia and combined spinal-epidural analgesia If there are concerns about the baby's wellbeing, consider the underlying cause, and offer intravenous fluids if the woman is hypotensive 	Not determined
Queensland Health; Queensland Government, 2022/Australia	Normal Birth Guideline	On admission, conduct routine urinalysis & assess nutrition and hydration status	<p>Oral intake:</p> <ul style="list-style-type: none"> Nutrition as desired and encourage hydration (during second stage, offer oral fluid sips between contractions) <p>Intravenous fluids:</p> <ul style="list-style-type: none"> Nothing specified 	Not determined
World Health Organization, 2018/International	WHO recommendations on intrapartum care for a positive childbirth experience	Nil	<p>Oral intake:</p> <ul style="list-style-type: none"> Low-risk women should be encouraged to drink fluids during labor. <p>Intravenous fluids:</p> <ul style="list-style-type: none"> The use of intravenous fluids with the aim of shortening the duration of labor is not recommended. The risk of maternal fluid overload, particularly when intravenous oxytocin infusion becomes indicated during labor, might become accentuated. Intravenous (IV) fluid may become necessary for other indications and or supportive care in labor even for low-risk women 	Very low-quality evidence

(Continues)

TABLE 1 (Continued)

Recommendations about intrapartum hydration assessment and management				
Authors, year/country	Name of guideline	Hydration assessment	Hydration management	
Public Health Agency of Canada, Canada/2018	Care during labor and Birth. Maternity newborn care guidelines	The presence of ketonuria is a signal for metabolic imbalance and reduces the efficiency of uterine activity, which may lead to augmentation of labor with oxytocin. Women who have long labors have higher levels of ketones in their urine	Oral intake: <ul style="list-style-type: none"> When given a choice, women demonstrate an ability to moderate their intake of food and drink to meet their needs, naturally slowing intake toward the end of labor. Women who are at low risk of requiring general anesthesia should have the choice to eat or drink as desired or tolerated. If a woman receives an epidural, it is important to re-evaluate her risk with respect to ongoing oral intake. Intravenous fluids: <ul style="list-style-type: none"> Routine intravenous fluid therapy is a common practice in labor, but it decreases the woman's ability to stay mobile and increases her risk of fluid overload. IVT does not meet nutritional needs in labor, regardless of the type of solution used. May also affect breastfeeding due to edema in the breasts postpartum. Only certain medically indicated situations require intravenous fluid therapy 	Not determined
World Health Organization 2014/International	WHO Recommendations for Augmentation of Labour	Nil	Oral intake: <ul style="list-style-type: none"> For women at low risk, oral fluid and food intake during labor is recommended. The restriction of oral fluid and food intake during labor has no beneficial effects on important clinical outcomes including use of labor augmentation (emphasis should be on respect for the wishes of the woman) Intravenous fluids: <ul style="list-style-type: none"> The use of intravenous fluids with the aim of shortening the duration of labor is not recommended. <i>It was noted that no patients of Mendelson's syndrome (inhalation of food and drink from the stomach into the lungs during general anesthesia—the most important safety concern limiting oral intake during labor) were reported in over 3000 women participating in the trials included</i>	Very low-quality evidence

TABLE 1 (Continued)

Authors, year/country	Recommendations about intrapartum hydration assessment and management			Level of evidence
	Name of guideline	Hydration assessment	Hydration management	
Ministry of Health. Induction of Labour in Aotearoa New Zealand: A clinical practice guideline/2021	Induction of Labour in Aotearoa New Zealand: A Clinical Practice Guideline	Nil	Nil reference to oral or IVT during labor and birth	Not applicable
World Health Organization, 2018/International	Induction of labor at or beyond term	Nil	Nil reference to oral or IVT during labor and birth	Not applicable
The American College of Obstetricians and Gynecologists ^a , 2009/United States of America	Practice Bulletin No. 107: Induction of Labor	Nil	Nil reference to oral or IVT during labor and birth	Not applicable
National Institute for Health and Care United Kingdom/2021	Inducing Labor NICE Guideline	Nil	Nil reference to oral or IVT during labor and birth	Not applicable
Queensland Health: Queensland Government, 2022/Australia	Maternity and Neonatal Guideline: Induction of labor	Nil	Nil reference to oral or IVT during labor and birth	Not applicable

^aSpelling of words across American and English styles consistent with original papers.

Our earlier work identified that women undergoing induction of labor are routinely administered “maintenance” IVT,⁷ even in the context of eating and drinking. One recent study reported that women undergoing induction of labor receive close to seven liters on average of IVT during induction of labor.⁴⁷ There are known, significant risks, and potentially unknown risks associated with large volumes of IVT. Serious maternal complications such as fluid overload and hyponatremia²² have resulted from indiscriminate IVT volumes, and the increasing focus on encouraging habitual oral water intake has furthermore added to the problem.²³ Of furthermore concern, maternal hyponatremia may increase rates of respiratory distress and hyperbilirubinemia in hyponatremic infants.²⁴ Chantry and colleagues⁴⁸ conducted an observational study ($n=448$) that found that the administration of IVT to women during labor was associated with fetal volume expansion and greater newborn weight loss in the early postnatal period. Specifically, intrapartum fluid balance (adjusted relative risk for Estimate Weight Loss of 3.18 [95% confidence interval [CI]: 1.35–13.29] and 2.80 [95% CI: 1.17–11.68] with net intrapartum fluid balance of >200 and 100–200 mL/h, respectively, compared with 100 mL/h) and delayed lactogenesis (adjusted relative risk: 3.35 [95% CI: 1.74–8.10]) were found. Excessive newborn weight loss contributes to maternal concerns about low milk supply; a strong predictor in discontinuing breastfeeding.⁴⁹

Poor compliance with documentation of the rationale for intravenous fluid administration by midwifery and medical staff exists,^{20,29} and the guidelines we analyzed failed to acknowledge the importance of assessing maternal hydration before commencing IVT. A thorough clinical assessment of maternal hydration status is required before any intravenous fluid is prescribed and administered.⁵⁰ However, midwifery assessment, documentation, and practice pertaining to hydration were found to be lacking, despite the known utility of fluid balance charts to document input and output.⁵¹

How midwives and obstetricians assess and manage intrapartum maternal hydration is an area poorly understood, with noted clinical variation in practice,²⁹ compounded by incomplete or absent documentation,²⁰ rendering local clinical audits of practice problematic. WHO recommends oral fluid intake as a practice that should be encouraged and IVT as a practice that is clearly harmful or ineffective and should be eliminated in low-risk women.¹⁴ However, in the absence of local policy or guidelines reflecting these recommendations, harmful practices persist.⁵¹ Furthermore, WHO has identified that the widespread and unnecessary use of routine administration of intravenous fluids for all women in labor in many health care facilities in low, middle, and high-income settings increases cost, has a considerable impact on resource use, and reduces women's mobility, and therefore has made a recommendation

against this intervention.¹⁴ However, this has not been clearly translated into resources such as local workplace policies³⁸ to mitigate variation in practice, which pervades, arguably due to a lack of guidance across contexts outside the normal labor (such as induction of labor or during regional analgesia), inconsistent documentation,²⁰ and a reliance on historical practice.

A limitation of this study is that there was no guideline specific to our original intention; however, our team then broadened our search scope to include all guidelines publicly available in parallel to the original topic of interest to extract other relevant recommendations. We acknowledge that we may not have found all clinical guidelines on this topic, despite our rigorous and methodological search approach, and thus this may be an additional limitation to our review.

5 | CONCLUSIONS

This review identified an absence of guidelines specific to the assessment and management of maternal hydration in labor and birth and is thus an “empty review.” Of the broader guidelines subsequently reviewed, which provided advice on intrapartum care more generally, inconsistencies and gaps were evident. An consistent, evidence-based approach to maternal hydration assessment should underpin fluid management—yet this was largely absent from the guidelines. We recommend furthermore high-quality primary studies are undertaken, from which clear guidelines can be developed. We also recommend guidelines are developed informed by what evidence exists to date to address potential clinical variation in this important component of maternity care.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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REFERENCES

- Eslamian L, Marsoosi V, Pakneeyat Y. Increased intravenous fluid intake and the course of labor in nulliparous women. *Int J Gynaecol Obstet*. 2006;93(2):102-105.
- Maheux PC, Bonin B, Dizazo A, et al. Glucose homeostasis during spontaneous labor in normal human pregnancy. *J Clin Endocrinol Metab*. 1996;81(1):209-215.
- Dawood F, Dowswell T, Quenby S. Intravenous fluids for reducing the duration of labour in low risk nulliparous women. *Cochrane Database Syst Rev*. 2013;6:1465-1858.
- Pierce SJ, Kupittayanant S, Shmygol T, Wray S. The effects of pH change on Ca(++) signaling and force in pregnant human myometrium. *Am J Obstet Gynecol*. 2003;188(4):1031-1038.
- Declercq ER, Belanoff C, Sakala C. Intrapartum care and experiences of women with midwives versus obstetricians in the listening to mothers in California survey. *J Midwifery Womens Health*. 2020;65(1):45-55.
- Kearney L, Craswell A, Massey D, et al. Peripheral intravenous catheter management in childbirth (PICMIC): a multi-centre, prospective cohort study. *J Adv Nurs*. 2021;77(11):4451-4458.
- Garite TJ, Weeks J, Peters-Phair K, Pattillo C, Brewster WR. A randomized controlled trial of the effect of increased intravenous hydration on the course of labor in nulliparous women. *Am J Obstet Gynecol*. 2000;183(6):1544-1548.
- Singata M, Tranmer J, Gyte GM. Restricting oral fluid and food intake during labour. *Cochrane Database Syst Rev*. 2013;2013(8):CD003930.
- Providing oral nutrition to women in labor: American College of Nurse-Midwives. *J Midwifery Womens Health*. 2016;61(4):528-534.
- Mendelson CL. The aspiration of stomach contents into the lungs during obstetric anesthesia. *Am J Obstet Gynecol*. 1946;52:191-205.
- McDermott L, Pelecanos A, Krepska A, et al. Single-centre survey of women reflecting on recent experiences and preferences of oral intake during labour. *Aust N Z J Obstet Gynaecol*. 2022;62(5):643-649.
- World Health Organisation. WHO Recommendations in Intrapartum Care for a Positive Childbirth Experience. Geneva: WHO; 2018.
- Smith I, Kranke P, Murat I, et al. Perioperative fasting in adults and children: guidelines from the European Society of Anaesthesiology. *Eur J Anaesthesiol*. 2011;28(8):556-569.
- Sperling JD, Dahlke JD, Sibai BM. Restriction of oral intake during labor: whither are we bound? *Am J Obstet Gynecol*. 2016;214(5):592-596.
- Peters LL, Thornton C, de Jonge A, et al. The effect of medical and operative birth interventions on child health outcomes in the first 28 days and up to 5 years of age: a linked data population-based cohort study. *Birth*. 2018;45(4):347-357.
- Hernandez-Lopez A. Influence of hydration strategies on maternal-fetal morbidity in nulliparous pregnant women in labour. *Reduca*. 2012;4(5):271-287.
- Bruce BR, Hartz DL, Tracy SK, Leask J, de Vries BS. The administration of intravenous fluids to nulliparous women in labour: a retrospective clinical chart review and fluid balance documentation audit. *Collegian*. 2022;29(3):364-369.

18. Lindstrom H, Kearney L, Massey D, Godsall G, Hogan E. How midwives manage rapid pre-loading of fluid in women prior to low dose epidurals: a retrospective chart review. *J Adv Nurs*. 2018;74(11):2588-2595.
19. Bruce BR, Leask J, De Vries BS, Shepherd HL. Midwives' perspectives of intravenous fluid management and fluid balance documentation in labour: a qualitative reflexive thematic analysis study. *J Adv Nurs*. 2023;79(2):749-761.
20. Harper LM, Caughey AB, Odibo AO, Roehl KA, Zhao Q, Cahill AG. Normal progress of induced labor. *Obstet Gynecol*. 2012;119(6):1113-1118.
21. Moen V, Brudin L, Rundgren M, Irestedt L. Hyponatremia complicating labour-rare or unrecognized? A prospective observational study. *BJOG*. 2009;116(4):552-561.
22. Johansson S, Lindow S, Kapadia H, Norman M. Perinatal water intoxication due to excessive oral intake during labour. *Acta Paediatr*. 2002;91(7):811-814.
23. Singhi SC, Chookang E. Maternal fluid overload during labour; transplacental hyponatraemia and risk of transient neonatal tachypnoea in term infants. *Arch Dis Child*. 1984;59(12):1155-1158.
24. Ehsanipoor RM, Saccone G, Seligman NS, Pierce-Williams RAM, Ciardulli A, Berghella V. Intravenous fluid rate for reduction of cesarean delivery rate in nulliparous women: a systematic review and meta-analysis. *Acta Obstet Gynecol Scand*. 2017;96(7):804-811.
25. McKenzie AL, Armstrong LE. Monitoring body water balance in pregnant and nursing women: the validity of urine color. *Ann Nutr Metab*. 2017;70(Suppl 1):18-22.
26. Watson J, Hodnett E, Armson BA, Davies B, Watt-Watson J. A randomized controlled trial of the effect of intrapartum intravenous fluid management on breastfed newborn weight loss. *J Obstet Gynecol Neonatal Nurs*. 2012;41(1):24-32.
27. Romano AM. First, do no harm: how routine interventions, common restrictions, and the organization of our health-care system affect the health of mothers and newborns. *J Perinat Educ*. 2009;18(3):58-62.
28. McConachie A. Health assessment. In: Potter A, Perry P, Ostendorf W, Laplante N, eds. *Nursing Clinical Skills and Techniques*. Elsevier; 2021:108-168.
29. Lee N, Tracy SK. Disturbances in the rhythm of labour. 2018.
30. Field MJ, Lohr KN. *Clinical Practice Guidelines Directions for a New Program*. ProQuest, editor. National Academy Press; 1990.
31. Gundersen L. The effect of clinical practice guidelines on variations in care. *Ann Intern Med*. 2000;133(4):317-318.
32. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol*. 2005;8(1):19-32.
33. Pollock D, Davies EL, Peters MD, et al. Undertaking a scoping review: a practical guide for nursing and midwifery students, clinicians, researchers, and academics. *J Adv Nurs*. 2021;77(4):2102-2113.
34. Peters MD, Marnie C, Colquhoun H, et al. Scoping reviews: reinforcing and advancing the methodology and application. *Syst Rev*. 2021;10(1):1-6.
35. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71.
36. Bryant AS, Borders AE. ACOG COMMITTEE OPINION number 766: approaches to limit intervention during labor and birth. *Obstet Gynecol*. 2019;133(2):E164-E173.
37. ACOG practice bulletin no. 107: Induction of labor. *Obstet Gynecol*. 2009;114(2):386-397.
38. Queensland Health. Induction of Labour Brisbane: Queensland Clinical Guidelines; 2017. https://www.health.qld.gov.au/__data/assets/pdf_file/0020/641423/g-iol.pdf
39. Ministry of Health. Induction of Labour in Aotearoa New Zealand: A clinical practice guideline 2019. Wellington: Ministry of Health; 2021.
40. WHO. WHO Recommendations for Augmentation of Labour 2014. <https://www.ncbi.nlm.nih.gov/books/NBK258881/>
41. WHO. WHO recommendations: Induction of labour at or beyond term. Geneva: WHO; 2018.
42. National Institute for Health and Care Excellence. Intrapartum care for healthy women and babies. United Kingdom: National Institute for Health and Care Excellence; 2021. <https://www.nice.org.uk/guidance/cg190/resources/intrapartum-care-for-healthy-women-and-babies-pdf-35109866447557>
43. Canada PHAo. Care During Labour and Birth Government of Canada 2018. <https://www.canada.ca/en/public-health/services/publications/healthy-living/maternity-newborn-care-guidelines-chapter-4.html>
44. Yaffe J, Montgomery P, Hopewell S, Shepard LD. Empty reviews: a description and consideration of cochrane systematic reviews with no included studies. *PloS One*. 2012;7(5):e36626.
45. Gray R. Empty systematic reviews: identifying gaps in knowledge or a waste of time and effort? *Nurse Author Ed*. 2021;31(2):42-44.
46. Slyer JT. Unanswered questions: implications of an empty review. *JBI Database System Rev Implement Rep*. 2016;14(6):1-2.
47. Chantry CJ, Nommsen-Rivers LA, Peerson JM, Cohen RJ, Dewey KG. Excess weight loss in first-born breastfed newborns relates to maternal intrapartum fluid balance. *Pediatrics*. 2011;127(1):e171-e179.
48. Flaherman VJ, Beiler JS, Cabana MD, Paul IM. Relationship of newborn weight loss to milk supply concern and anxiety: the impact on breastfeeding duration. *Matern Child Nutr*. 2016;12(3):463-472.
49. National Institute for Health and Care Excellence. Intravenous fluid therapy in adults in hospital: quality standard. United Kingdom: National Institute for Health and Care Excellence; 2014.
50. Jeyapala S, Gerth A, Patel A, Syed N. Improving fluid balance monitoring on the wards. *BMJ Qual Improv Rep*. 2015;4(1):u209890.w4102.
51. Nagpal J, Sachdeva A, Sengupta Dhar R, Bhargava VL, Bhartia A. Widespread non-adherence to evidence-based maternity care guidelines: a population-based cluster randomised household survey. *BJOG*. 2015;122(2):238-247.

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