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A nation-wide study on the common reasons for infant formula supplementation among healthy, term, breastfed infants in US hospitals

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Abstract

In-hospital infant formula supplementation of breastfed infants reduces breastfeeding duration, yet little is known about common reasons for infant formula supplementation. We examined the three most common reasons for in-hospital infant formula supplementation of healthy, term, breastfed infants in the US reported by hospital staff. Hospital data were obtained from the 2018 Maternity Practices in Infant Nutrition and Care survey ($n = 2045$), which is completed by hospital staff. An open-ended question on the top three reasons for in-hospital infant formula supplementation was analyzed using thematic qualitative analysis and the frequencies for each reason were reported. The top three most common reasons for in-hospital infant formula supplementation reported by hospital staff included medical indications (70.0%); maternal request/preference/feelings (55.9%); lactation management-related issues (51.3%); physical but non-medically indicated reasons (36.1%); social influences (18.8%); perceived cultural/societal/demographic factors (8.2%) and medical staff/institutional practices (4.7%). These findings suggest that a variety of factors should be considered to address unnecessary infant formula supplementation. Lactation management support delivered in a timely and culturally sensitive manner and targeted to mother-infant dyads with potential medical and physical indications may reduce unnecessary in-hospital infant formula supplementation.

KEYWORDS

breast milk substitutes, breastfeeding, breastfeeding initiation, developed countries, infant formula, qualitative methods

1 | INTRODUCTION

Exclusive breastfeeding for the first 6 months of life has been established as the normative standard for infant feeding, with continued breastfeeding along with complementary foods for 1 year or beyond by the American Academy of Pediatrics (Eidelman, 2012) or 2 years and beyond by the World Health Organization (World Health Organization, 2011). The recent Dietary Guidelines for Americans, 2020–2025 also recommends exclusive breastfeeding for about the first 6 months of life (US Department of Agriculture and US Department of Health and Human Services, 2020). The introduction of infant formula is associated with adverse health consequences for infants including increased risks for infectious diseases (e.g., respiratory infections, gastrointestinal infections, otitis media, etc.) and noninfectious disease (e.g., sudden infant death syndrome, allergic disease, etc.) (Eidelman, 2012; Victora et al., 2016). National Healthy People 2030 goals are to increase the proportion of infants who are exclusively breastfed through 6 months to 42% and to increase the proportion of infants who are breastfed at 1 year to 54% (Office of Disease Prevention and Health Promotion, 2020). In the United States, 84% of children initiate breastfeeding; however, only 26% exclusively breastfeed for 6 months and 35% breastfeed for 1 year (Centers for Disease Control and Prevention, 2020a). In-hospital exclusive breastfeeding during the days immediately after birth has been shown to be important for continued duration (Chantry et al., 2014). Yet 19% of US breastfed infants born in 2017 were supplemented with infant formula in the first 2 days of life, which is an increase from 17% in 2016 (Centers for Disease Control and Prevention, 2020a).

Infant formula supplementation of breastfed newborns often occurs during the intrapartum period, in which the mother-infant dyad remain in the hospital following birth (Nelson et al., 2016). In-hospital infant formula supplementation has been associated with decreased breastfeeding duration at 2 months (Chantry et al., 2014), up to the first year of life (McCoy & Heggie, 2020). Brief episodes of in-hospital infant formula supplementation among breastfed newborns are associated with changes to the microbiota, and nonexclusive breastfeeding is associated with increased risks for allergic disease and type 1 diabetes (Eidelman, 2012; Forbes et al., 2018). Infant formula supplementation during this time can interfere with the supply and demand nature of this phase of lactogenesis (Pang & Hartmann, 2007) and can potentially lead to decreased supply and reduced breastfeeding duration, which is associated with adverse health impacts for the infant and mother (Feltner et al., 2018; Victora et al., 2016).

Infant formula supplementation of breastfed infants is necessary in some circumstances, after proper assessment identifies a medical indication, and when mothers' expressed milk or donor human milk are not available. The Academy of Breastfeeding Medicine (ABM) Clinical Protocol lists possible medical indications for supplementation such as hypoglycemia for the infant or chemotherapy treatment for the mother (Kellams et al., 2017). However, non-medically indicated factors have been found to be associated with unnecessary in-hospital infant formula supplementation such as caesarean section birth and large-for-gestational age newborns (Garrison & Maisano, 2019). Lactation management-related factors have been previously reported as common reasons for in-hospital infant formula supplementation such as perceived insufficient milk supply, signs of inadequate intake and poor latch (Chantry et al., 2014). Personalised lactation care may minimise infant formula supplementation for these non-medically indicated factors (Garrison & Maisano, 2019; Kellams et al., 2017; Medina Poeliniz et al., 2020). However, most existing studies on reasons for in-hospital infant formula supplementation were conducted in a single hospital. The purpose of this analysis was to examine the three most common reasons for in-hospital infant formula supplementation of healthy, term, breastfed infants reported by hospital staff.

Key messages

- The three most commonly reported reasons by hospital staff for infant formula supplementation were found to be related to medical indications (70.0%); maternal request/preference/feelings about breastfeeding such as frustration or lack of confidence (55.9%); lactation management-related issues (51.3%); physical but non-medically indicated reasons (36.1%); social influences (18.8%); perceived cultural/societal/demographic factors (8.2%); and medical staff/institutional practices (4.7%).
- Underlying many of the reported three most common reasons for infant formula supplementation is potentially lack of lactation management support that considers the social influences (e.g. from family and friends) and that is culturally relevant.
- These findings suggest that a variety of factors should be considered to address unnecessary infant formula supplementation.

2 | METHODS

2.1 | Data source

Data were obtained from the 2018 Maternity Practices in Infant Nutrition and Care (mPINC) survey, which is a voluntary census administered biennially by the Centers for Disease Control and Prevention (CDC) to all maternity hospitals in the US and territories

(Centers for Disease Control and Prevention, 2020b). Information on routine maternity care and infant feeding policies and practices are collected through a survey from each facility, specifically from the staff person identified as most knowledgeable about the policies and practices at the facility, with input from others as necessary (Centers for Disease Control and Prevention, 2020c). Often, a group of maternity care staff complete the survey (Centers for Disease Control and Prevention, 2020c). In 2018, hospital personnel were asked the following qualitative, open-ended question: 'what are the 3 most common situations that lead to recommendations or requests for formula for healthy breastfed newborns during the hospital stay?' Other data obtained from the mPINC survey included hospital type; teaching status; Baby-Friendly hospital designation; and total annual live births.

2.2 | Analysis

The responses to the open-ended question were analyzed using thematic analysis. We used the phases described by Braun and Clarke (2006), which include becoming familiar with the data (noting initial ideas), generating initial codes (systematically coding features of the data), searching for themes (gathering data relevant to the themes), reviewing themes (checking themes in relationship to the coded extracts), defining and naming themes (refining specifics of each theme) and producing a report (relating information back to the research question and literature) (Braun & Clarke, 2006). There were modifications to this process to accommodate our data set, considering the large volume of responses such as taking a simple random sample (SRS), developing a codebook and memo writing (Bazeley, 2013; Hennink et al., 2015). In addition, this process enabled the use of existing literature while also allowing flexibility to capture novel responses (Braun & Clarke, 2006).

To become familiar with the responses and to develop codes considering the large number of responses, a simple random sample (SRS) of 20% ($n = 409$) of the responses to the qualitative mPINC question were taken using SAS 9.4 and imported to MAXQDA2020 to begin qualitative analysis. For this 20% SRS, the first author (LB) and an additional qualitative analyst (DE) reviewed the data while noting initial concepts; developed codes and a codebook; and independently applied codes. LB and DE discussed coding discrepancies, overarching categories for codes and potential themes. LB wrote memos on the resolution to the discrepancies; LB updated the codebook; and LB and DE made corrections to previously coded data. LB coded the remaining 80% of the responses using the updated codes; themes were further reviewed and defined using memo writing while also considering ABM Clinical Protocols (Hernandez-Aguilar et al., 2018; Holmes et al., 2013; Kellams et al., 2017). Breastfeeding contraindications (e.g., illicit drug use, incompatible medication and HIV), higher level of care for infants, prematurity, offering donor human milk for supplementation instead of infant formula, and other extenuating circumstances were not included in further analysis due to the focus on infant formula supplementation of healthy, term, breastfed newborns. We wrote a report of our qualitative analysis, which included a description of our themes.

The results from the qualitative analysis were imported to SAS 9.4. Descriptive analysis was conducted to report the characteristics of the hospitals that responded to the mPINC survey. Descriptive analysis was also conducted to report the count and frequency of the themes and subcategories within the overarching themes. Some hospitals reported multiple subcategories from one theme; however, the descriptive statistics for themes only counted hospitals once if the theme was present. For example, a hospital may list hypoglycemia, jaundice, and inadequate elimination as the three most common reasons for infant formula supplementation; however, this hospital would only be counted once in the frequency for the overarching theme of medical indications.

3 | RESULTS

Two thousand forty-five hospitals representing 70% of hospitals providing maternity care in the US responded to the question asking for the three most common reasons for infant formula supplementation in the 2018 mPINC survey. Hospitals were mostly non-profit (77%) and teaching hospitals (69%) and 25% were Baby-Friendly Hospital Initiative (BFHI) designated (Table 1) (World Health Organization and UNICEF, 2018).

Seven themes for the three most common reasons for in-hospital infant formula supplementation reported by hospital staff were identified in the qualitative analysis: medical indications (70.0%); maternal request/preference/feelings (55.9%); lactation management-related issues (51.3%); physical but non-medically

TABLE 1 Characteristics of hospitals responding to the top three most common reasons for infant formula supplementation of healthy breastfed newborns reported by hospital staff—mPINC 2018 ($n = 2045$)

Characteristic	*n* (%)
Hospital type	
Government	85 (4.2%)
Non-profit	1569 (76.7%)
Private	385 (18.8%)
Military	6 (0.3%)
Teaching hospital	1411 (69.0%)
Baby-friendly hospital designation	504 (24.7%)
Total live births	
1–499	717 (35.1%)
500–999	437 (21.4%)
1000–1999	450 (22.0%)
2000–4999	391 (19.1%)
≥5000	50 (2.4%)

Abbreviation: mPINC, Maternity Practices in Infant Nutrition and Care.

indicated reasons (36.1%); social influences (18.8%); perceived cultural/societal/demographic factors (8.2%) and medical staff/institutional practices (4.7%). Subcategories for each theme and theme definitions are reported in Table 2.

Medical indications were the most frequently reported theme; 70.0% of hospitals reported a medical indication for infant formula as listed in ABM Clinical Protocol #3 on Supplementary Feeding in the Healthy Term Breastfed Neonate as at least one of the most common situations leading to infant formula supplementation (Kellams et al., 2017). The highest subcategory within the theme medical indications was hypoglycemia in the infant (46.1%). The second highest subcategory was weight loss (36.5%), in which a range of responses were reported including a general mention of weight loss to specific mention of supplementation for weight loss beginning at 7% up to 12% of birth weight.

Maternal request, preference, or feelings about breastfeeding was reported by 55.9% of hospitals. Request (34.8%) and preference (15.6%) of the mother were the most frequently reported subcategories for this theme. Some hospitals reported that requests for infant formula supplementation were made after the provision of lactation management education or support (4.0%). Some hospitals reported that mothers decided to breastfeed and provide infant formula before admission for birth (2.5%); for example, a hospital reported 'patients that come in choosing both breastfeeding and formula feeding'. Mothers' previous feeding experience of an older child included providing infant formula to other children or unpleasant previous breastfeeding experiences were reported by hospital staff as one of the three most common reasons for infant formula supplementation (1.6%). Feelings about breastfeeding included hospitals reporting mothers' frustrations with feeding (3.0%) and mothers' lack of confidence (0.3%).

Lactation management-related issues were reported by 51.3% of all hospitals. The most frequently mentioned subcategory for this theme was perceived low milk supply by the mother (16.5%), which encompassed mothers mentioning that they have 'no milk', and mothers mentioning not having 'enough milk' to provide to the infant. Many hospitals that reported perceived low milk supply also reported concerns about infant hunger (14.0%) as a separate common reason. The subcategory, concern about infant hunger, in contrast to perceived low milk supply included infants not 'getting enough' and additionally included the infant not appearing satisfied after feeding, which was expressed through infant crying. A variety of other concepts were mentioned related to lactation management including latching issues (10.0%); inconsolable infants (6.1%); cluster feeding (closely spaced nursing sessions) or feeding frequency (4.5%); difficulty breastfeeding (4.9%); breastfeeding concerns that arise during night hours (3.7%); lack of knowledge (3.2%) and soreness or discomfort of the breast or nipple (2.6%). The subcategory pain specific to breastfeeding (2.4%) consisted of responses that listed 'pain' due to concerns such as 'nipple damage' or 'cracked nipples'. In contrast, the subcategory soreness or discomfort of the breast or nipple (2.6%) included less severe breast and nipple-related issues.

A total of 36.1% of hospitals reported at least one of the most common situations leading to infant formula supplementation being *physical but non-medically indicated*. The medical conditions included in this theme are those that are not listed as a possible medical indication for infant formula supplementation in ABM Clinical Protocol #3 on Supplementary Feeding in the Healthy Term Breastfed Neonate (Kellams et al., 2017). This theme consisted mostly of concepts related to maternal exhaustion or fatigue (25.4%). Mothers' desire for rest following birth and dyad separation (2.2%) often were reported together, for example, a hospital mentioned 'mothers want to sleep and want baby to stay in the nursery' as one of the three most common reasons for infant formula supplementation. This theme also includes a general mention of unrelated health issues (6.7%), infant birth weight or size (1.8%), generalised pain/discomfort of the mother that is not specific to breastfeeding (1.6%) and a variety of other physical related reasons.

Social influences were among the three most common reasons for infant formula supplementation for 18.8% of hospitals. This includes the specific mention of 'parents' making decisions (8.4%) or requests related to infant feeding. Family and friends (4.8%) were reported to encourage providing infant formula or not be supportive of breastfeeding, which led to infant formula supplementation. For example, one hospital reported that 'family members pressure mothers to provide formula'. The subcategory family and friends also included report of mothers not wanting to breastfeed in front of family and friends, so they choose to feed infant formula during these visits.

A total of 8.2% of hospitals reported *perceived cultural/societal/demographic factors* as one of the three most common reasons for infant formula supplementation. This included a general mention of cultural beliefs (4.6%). Some hospitals specifically mentioned Hispanic culture (1.5%) as one of the most common reasons leading to infant formula supplementation, which included cultural norms of perceived low milk supply. Some hospitals further explained this as cultural beliefs related to perceptions of low milk supply or 'Hispanic populations feel that first milk is no good'. In addition, other factors were related to societal factors such as returning to work and demographic factors such as young age.

Concepts related to *medical staff/institutional practices* were the least reported theme (4.7%). Several of the hospitals reported doctors' requests in conjunction with medical indications or physical/medical-related conditions. However, 3.2% of hospitals reported doctors' requests without further explanation. Additionally, there was mention of staff lacking knowledge and staff not providing adequate education to patients (1.0%) as reported by one hospital: 'staffs lack of support and ability/willingness to educate patient and family'.

The results were similar for BFHI designated hospitals and non-BFHI designated hospitals, with the exception of medical staff/institutional practices. Only 1.2% of BFHI designated hospitals reported medical staff/institutional practices as one of the three most common reasons for infant formula supplementation compared to 5.6% of non-BFHI designated hospitals (results not shown).

TABLE 2 Themes, theme definitions and subcategories for the top three most common reasons for infant formula supplementation of healthy breastfed newborns reported by hospital staff—mPINC 2018 (n = 2045)

Reasons for infant formula supplementation			
Theme: Definition	***n* (%)**	**Subcategories**	***n* (%)**
Medical indications: Possible medical indications for supplementation in healthy, term infants as listed in ABM Clinical Protocol #3 on Supplementary Feeding in the Healthy Term Breastfed Neonate.	1431 (70.0%)	Hypoglycemia	943 (46.1%)
		Weight loss	747 (36.5%)
		Jaundice	555 (27.1%)
		Inadequate elimination	44 (2.2%)
		Lethargic	18 (0.9%)
		Dehydration	17 (0.8%)
		Medications	14 (0.7%)
		Breast pathology/prior breast surgery	11 (0.5%)
		Intake concerns	8 (0.4%)
		Delayed secretory activation	8 (0.4%)
		Elevated sodium	2 (0.1%)
		Insufficient glandular tissue	1 (0.1%)
Maternal request/preference/feelings: Mothers' specific requests and preferences and the discussion of feelings related to breastfeeding such as lack of confidence or frustration.	1144 (55.9%)	Request of mother	712 (34.8%)
		Preference of mother	318 (15.6%)
		Infant formula requested after education provided	82 (4.0%)
		Frustration	61 (3.0%)
		Maternal plans	51 (2.5%)
		Previous feeding experience	32 (1.6%)
		Convenience	11 (0.5%)
		Lack of confidence	6 (0.3%)
		Mothers waiting until they go home to begin breastfeeding	3 (0.2%)
		Lack of breastfeeding effort	1 (0.1%)
		Perception that infant does not 'like' breastfeeding	1 (0.1%)
		Body image	1 (0.1%)
Lactation management-related issues: Reasons that are directly related to lactation and the act of breastfeeding for the mother and infant.	1048 (51.3%)	Mothers' perceived low milk supply	338 (16.5%)
		Concern about infant hunger	286 (14.0%)
		Latching issues	205 (10.0%)
		Inconsolable infant/fussiness	124 (6.1%)
		Difficulty breastfeeding	101 (4.9%)
		Low milk supply only	96 (4.7%)
		Cluster feeding/feeding frequency	92 (4.5%)
		Concerns during the night	75 (3.7%)
		Mothers lack of lactation management knowledge	65 (3.2%)
		Soreness/discomfort of breast or nipple	54 (2.6%)
		Ineffective suckling	49 (2.4%)

(Continues)

TABLE 2 (Continued)

Reasons for infant formula supplementation			
Theme: Definition	***n* (%)**	**Subcategories**	***n* (%)**
		Pain specific to breastfeeding	48 (2.4%)
		Challenging anatomy for breastfeeding	12 (0.6%)
		Extended feedings	2 (0.1%)
		Breastfeeding assistance device usage	1 (0.1%)
Physical but non-medically indicated: Reasons related to the physical state of the mother or infant that are not listed in ABM Clinical Protocol #3 and that are not directly related to breastfeeding.	739 (36.1%)	Maternal exhaustion/fatigue	520 (25.4%)
		Unknown medical reasons	136 (6.7%)
		Dyad separation	44 (2.2%)
		Birth weight/size	36 (1.8%)
		Generalised pain/discomfort of the mother	33 (1.6%)
		Concern about infant nutrition	14 (0.7%)
		Labour/delivery issues	14 (0.7%)
		Surgery	10 (0.5%)
		Diabetes	9 (0.4%)
		Mental health	8 (0.4%)
		Tongue tie	6 (0.3%)
		Lack of sleep for the infant	4 (0.2%)
		Haemorrhage/postpartum bleeding	4 (0.2%)
		Hypertension/pre-eclampsia	3 (0.2%)
		Positive Coombs test	3 (0.2%)
		Congenital anomalies/cleft	3 (0.2%)
		Failure to thrive	2 (0.1%)
		Reflux	2 (0.1%)
		Abnormal lab	2 (0.1%)
		Sepsis	2 (0.1%)
		Oedema	1 (0.1%)
		Maternal concern of own nutrition	1 (0.1%)
		Low body temperature	1 (0.1%)
		Post resuscitation	1 (0.1%)
Social influences: The influence of mothers' closest relationships such as family and friends and decisions made by parents.	384 (18.8%)	Requests by parents	172 (8.4%)
		Family and friends influence	98 (4.8%)
		Parents concern	51 (2.5%)
		Preference/choice of parents	48 (2.4%)
		Preference/choice of family	6 (0.3%)
		Lack of support	23 (1.1%)
		Requests by family	16 (0.8%)
		Perceived low milk supply by parents	13 (0.6%)
		Perceived low milk supply by family	8 (0.4%)

TABLE 2 (Continued)

Reasons for infant formula supplementation			
Theme: Definition	***n* (%)**	**Subcategories**	***n* (%)**
Perceived cultural/societal/demographic related factors: Reasons related to perceived cultural norms, societal factors, or demographics of the population served.	167 (8.2%)	Cultural beliefs	94 (4.6%)
		Hispanic culture	30 (1.5%)
		Perceived low milk supply by the culture	19 (0.9%)
		Preference/choice-culture	11 (0.5%)
		Returning to work	9 (0.4%)
		External environment	3 (0.2%)
		Young age	8 (0.4%)
Medical staff/institutional practices: Doctors or nurses requests or orders; medical staff's limited knowledge or skills related to lactation management; or hospital polices or practices.	97 (4.7%)	Doctors' request (nonspecific)	66 (3.2%)
		Limited knowledge or practices of staff	20 (1.0%)
		Staff related (nonspecific)	11 (0.5%)
		Understaffed	7 (0.3%)
		Standing orders/policy	3 (0.2%)

Note: Theme subcategories do not total to 100% because hospitals were counted once for frequency of themes and were counted more than once if applicable for each subcategory. (e.g., a hospital may list hypoglycemia, jaundice and inadequate elimination as the most common reasons for infant formula supplementation; however, this hospital would be counted once in the frequency for the overarching theme of medical indications).

Abbreviations: ABM, Academy of Breastfeeding Medicine; mPINC, Maternity Practices in Infant Nutrition and Care survey.

4 | DISCUSSION

This analysis provides insight into the common reasons for infant formula supplementation of healthy, term, breastfed infants reported by hospital staff across the United States. Over half of responding hospitals reported possible medical indications, maternal request/preference/feelings and lactation management-related issues as common reasons for infant formula supplementation. Less frequently reported common reasons for infant formula supplementation by hospitals were physical/medical-related conditions, social influences, perceived cultural/societal/demographic factors and medical staff/institutional practices.

A previously conducted analysis using 2013 mPINC data among US maternity hospitals, reported that the average hospital reported 65% of infants were supplemented with infant formula due to maternal request (Nelson et al., 2016). A qualitative study conducted among low-income women found that maternal request for in-hospital infant formula supplementation of healthy, breastfed infants was due to lack of preparation related to anticipatory guidance about infant behaviour (DaMota et al., 2012). Our analysis found that hospitals report that maternal requests are sometimes made after patient education is provided in the hospital setting, suggesting the need for more education before admission to the hospital for birth.

The most common lactation management concern reported was mothers' perceived low milk supply, which has been frequently reported by other studies (Boban & Zakarija-Grković, 2016; Pierro et al., 2016). In the early days following birth, low milk supply may be related to three potential factors, including (1) medical conditions that result in a delay in lactogenesis II, (2) practices that interrupt the normal physiology of breastfeeding and (3) mothers not understanding normal infant behaviour (Gatti, 2008; Kalmakoff et al., 2018; Nommsen-Rivers et al., 2012). Though research about primary insufficient breast milk supply related to concerns of the breast tissue is lacking, one older study suggests that it is rare, and is often secondary to practices that interrupt the normal physiology of breastfeeding (Neifert et al., 1990). The prevalence of pre-pregnancy obesity and older age at first birth are increasing nationally, and these factors may impact the onset of lactogenesis II, in which copious milk secretion occurs (Driscoll & Gregory, 2020; Mathews & Hamilton, 2016; Nommsen-Rivers et al., 2012). More research is needed to determine if low milk supply during the first few days following birth is primary (directly related to the physiology) or secondary (related to practices that interrupt the normal physiology of lactation). Practices such as skin-to-skin have been found to reduce the risk of infant formula supplementation among breastfed newborns, and this is a potential intervention to facilitate lactogenesis II and reduce infant formula supplementation (Kalmakoff et al., 2018; World Health Organization and UNICEF, 2018). Mothers' perceived low milk supply has been found to be related to perceived hunger of the child, which is expressed by crying and number or frequency of feedings (Gatti, 2008). Professional support that guides mothers to early optimal latching and informs signs of efficacious infant suckling may help to reduce mothers' perceived low milk supply and other related factors that potentially lead to infant formula supplementation (Galipeau et al., 2017; Gatti, 2008). In addition, some hospitals reported that many of the lactation management-related issues arise during the

night hours. One study reported that infants born at night had double the odds of in-hospital infant formula supplementation compared to infants born during the day (Grassley et al., 2014). There have also been reported differences in night staff attitudes compared to day staff attitudes, in which night staff are reported to be less committed to providing breastfeeding support because of the perception that the benefits of providing rest for the mother outweigh the benefits of providing breastfeeding support (Nickel et al., 2013; Schmied et al., 2011). Lactation management support during the night hours may be an important support for breastfeeding mother-infant dyads (Nickel et al., 2013; Schmied et al., 2011).

Similar to other studies, we found that physical conditions such as exhaustion and mothers' desire for sleep were one of the three most common reasons for infant formula supplementation (Pierro et al., 2016). Although infant formula feeding enables others, including family and medical staff, to feed the infant while the mother rests, the potential consequence includes disrupting the normal physiology of lactation resulting in a decreased milk supply, shorter duration of breastfeeding and adverse consequences of exposure to infant formula (e.g., changes to the microbiota, increased risk of allergic disease, etc.) (Chantry et al., 2014; Eidelman, 2012; Forbes et al., 2018; McCoy & Heggie, 2020). Other physical conditions have been reported, in which infants born via caesarean section and large-for-gestational-age infants were at greater risk for non-medically indicated infant formula supplementation (Garrison & Maisano, 2019). Identifying mothers with these physical but non-medically indicated conditions and targeting breastfeeding support may enable lactation staff to promptly intervene to avoid unnecessary infant formula supplementation (Garrison & Maisano, 2019).

The role of social influences on infant formula supplementation and nonexclusive breastfeeding has been reported previously in qualitative literature which suggests that this may be due to limited family experience and limited family breastfeeding knowledge (Asiodu et al., 2017; Deubel et al., 2019). Another study found that fathers' preference for infant formula supplementation was significantly associated with in-hospital infant formula supplementation (Parry et al., 2013). Similarly, many hospitals in our analysis used the term 'parents', which suggests that mothers were not alone in their decision making, and that fathers or partners may also have a role in the decision-making process for in-hospital infant formula supplementation. Further work is needed to understand the influence of partners and the potential joint decisions made between mothers and partners. It is possible that in some cases that when hospitals referred to 'parents' decision' that they meant mothers rather than fathers or other partners. The language surrounding female reproduction may have been desexed to account for people who are giving birth but who, because of their gender identity, do not wish to be referred to as mothers' (Grasso et al., 2021). The use of desexed terms are important for providing individual care, and more sophisticated methods for collecting information related to social influences as a common reason for infant formula supplementation reported by hospital staff may be needed to make this distinction in medical records and research (Grasso et al., 2021).

In alignment with other studies, perceived culture was also found to influence in-hospital infant feeding decisions (Asiodu et al., 2017; Hawley et al., 2015; Hohl et al., 2016; Pierro et al., 2016). Bias and stereotyping in healthcare may influence medical staff perceptions and behaviour toward patients of specific backgrounds (FitzGerald & Hurst, 2017). There are some common racial and ethnically driven misconceptions and stereotyping in breastfeeding practices, such as 'Hispanics do las dos cosas (both infant formula feeding and breastfeeding)' or 'black women do not breastfeed' (Panchula, 2012). Although this may be true in some cases, it is crucial not to generalise any behaviour for all mother-infant dyads of the same racial/ethnic group as this may negatively impact patient care (Hughes et al., 2020). A potential solution to dispelling myths includes maternity care staff training that focuses on the cultural humility approach, which is a lifelong commitment to building awareness about their own cultural biases and truly learning about patients as unique individuals with their own personal cultural background (Hughes et al., 2020; Tervalon & Murray-García, 1998). In addition, qualitative studies report that cultural differences may be related to factors such as lack of support networks that normalise breastfeeding among African American women and pressure to adopt the behaviours of US culture among Hispanic mothers (Deubel et al., 2019; Wambach et al., 2016). Hispanic mothers who immigrate to the US are reported to continue the cultural traditions of their native countries of initiating breastfeeding (Cartagena et al., 2014). However, they are reported to supplement with infant formula due to cultural practices of providing prelacteal feedings because of the concern that colostrum lacks nutritional value (Pak-Gorstein et al., 2009). Hispanic mothers are also reported to supplement breastfeeding with infant formula due to the misperception that infant formula provides additional nutrients, without understanding the risks of infant formula supplementation (Bunik et al., 2006). Peer breastfeeding support may be useful in overcoming cultural barriers and may facilitate delivery of culturally relevant support in hospitals with limited access to trained lactation professionals (Chapman & Pérez-Escamilla, 2012; Lutenbacher et al., 2018).

In contrast to previously conducted studies, we found that reasons related to the ABM's possible medical indications for infant formula supplementation were the most frequently reported three most common reasons for infant formula supplementation among hospitals. Other studies have found 75%–90% of in-hospital infant formula supplementation was not medically indicated (Biggs et al., 2018; Boban & Zakarija-Grković, 2016; Tender et al., 2009). However, these studies used medical records and surveys with mothers to collect data, whereas the mPINC survey is conducted among hospital staff (Biggs et al., 2018; Boban & Zakarija-Grković, 2016; Tender et al., 2009). Hospital staff may be less likely to report reasons that reflect substandard medical care such as providing infant formula to healthy, breastfed newborns without medical indications. In addition, these studies were conducted in small samples and in other countries, which defined medical indications of infant formula supplementation differently from the United States (Biggs et al., 2018; Boban & Zakarija-Grković, 2016; Tender et al., 2009). The onset and

development of some medical indications may not begin until after hospital discharge; for example, the onset of jaundice typically ranges from
2 to 5 days of life (Flaherman & Maisels, 2017). ABM Clinical Protocols include provision of appropriate lactation management support, and it is unclear if hospitals reporting medical indications provide lactation management support before infant formula supplementation. Further work is needed to understand if appropriate testing for conditions such as hypoglycemia and jaundice or if appropriate lactation management support are provided before infant formula supplementation is given, as recommended by the ABM Clinical Protocols. This includes reviewing policies and practices among clinicians to assure that infant formula supplementation is not automatically given without proper assessment when these potential medical indications arise.

From our analysis, we are unable to determine if the requests made by medical staff are based on proper assessment of medical conditions and provision of lactation management support before infant formula supplementation. Continued work is needed to further minimise this common reason for in-hospital infant formula supplementation reported by hospital staff as the American Academy of Pediatrics endorses the World Health Organization/United Nation's Children's Fund 'Ten Steps to Successful Breastfeeding', which recommends that infant formula is not given to breastfed infants unless medically indicated (Eidelman, 2012; World Health Organization and UNICEF, 2018).

This study offers insight into the three most common reasons for infant formula supplementation of breastfed newborns; however, key limitations exist. First, responses to the mPINC survey may be based on estimates made by the survey respondent and may or may not be based on what actually happened in the hospital (Centers for Disease Control and Prevention, 2020c). Second, nonresponse bias is possible; however, 70% of all US hospitals providing maternity care completed the survey. Third, due to the survey question design, the report of reasons for infant formula supplementation are not mutually exclusive and some hospitals reported common reasons for infant formula supplementation that fall into multiple subcategories within a theme. To address this, the overall frequency for the theme counts hospitals only once if the subcategory is reported. Fourth, we are unable to determine if these situations led to the practice of providing infant formula to breastfed newborns and the mother-infant dyad level prevalence of reasons for infant formula supplementation is unknown.

5 | CONCLUSION

Lactation management support underlies many of the most common reasons hospitals provide for giving infant formula to healthy, term breastfed newborns. Timely and culturally sensitive lactation management support that is targeted to mother-infant dyads with potential medical indications and physical but non-medically indicated conditions could potentially reduce unnecessary in-hospital infant formula supplementation.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

AUTHOR CONTRIBUTORS

LHB, EHA, MRK, CGP, HR-R, UR and MFY conceptualised the research question, study design and analytical approach. EHA and CGP contributed to data acquisition. LHB conducted data analysis. LHB, EHA, MRK, CGP, HR-R, UR and MFY contributed to data interpretation. LHB wrote the first and subsequent drafts of the article. LHB, EHA, MRK, CGP, HR-R, UR and MFY contributed to critically revising the article and gave approval of the version to be published.

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

Asiodu, I. V., Waters, C. M., Dailey, D. E., & Lyndon, A. (2017). Infant feeding decision-making and the influences of social support persons among first-time African American mothers. *Maternal and Child Health Journal*, *21*(4), 863–872. https://doi.org/10.1007/s10995-016-2167-x

Bazeley, P. (2013). *Qualitative data analysis: Practical strategies*. Sage Publications.

Biggs, K. V., Hurrell, K., Matthews, E., Khaleva, E., Munblit, D., & Boyle, R. J. (2018). Formula milk supplementation on the postnatal ward: A cross-sectional analytical study. *Nutrients*, *10*(5), 608. https://doi.org/10.3390/nu10050608

Boban, M., & Zakarija-Grković, I. (2016). In-hospital formula supplementation of healthy newborns: Practices, reasons, and their medical justification. *Breastfeeding Medicine*, *11*, 448–454. https://doi.org/10.1089/bfm.2016.0039

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Bunik, M., Clark, L., Zimmer, L. M., Jimenez, L. M., O'Connor, M. E., Crane, L. A., & Kempe, A. (2006). Early infant feeding decisions in low-income Latinas. *Breastfeeding Medicine*, *1*(4), 225–235. https://doi.org/10.1089/bfm.2006.1.225

Cartagena, D. C., Ameringer, S. W., McGrath, J., Jallo, N., Masho, S. W., & Myers, B. J. (2014). Factors contributing to infant overfeeding with Hispanic mothers. *Journal of Obstetric Gynecologic and*

Neonatal Nursing, *42*(2), 139–159. https://doi.org/10.1111/1552-6909.12279

Centers for Disease Control and Prevention. (2020a). National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition, Physical Activity, and Obesity. Data, Trend and Maps. https://www.cdc.gov/breastfeeding/data/nis_data/results.html

Centers for Disease Control and Prevention. (2020b). Maternity Practices in Infant Nutrition and Care (mPINC) Survey. https://www.cdc.gov/breastfeeding/data/mpinc/

Centers for Disease Control and Prevention. (2020c). Methods: Maternity Practices in Infant Nutrition and Care (mPINC) Survey. https://www.cdc.gov/breastfeeding/data/mpinc/methods.html

Chantry, C. J., Dewey, K. G., Peerson, J. M., Wagner, E. A., & Nommsen-Rivers, L. A. (2014). In-hospital formula use increases early breastfeeding cessation among first-time mothers intending to exclusively breastfeed. *Journal of Pediatrics*, *164*(6), 1339–1345. https://doi.org/10.1016/j.jpeds.2013.12.035

Chapman, D. J., & Pérez-Escamilla, R. (2012). Breastfeeding among minority women: Moving from risk factors to interventions. *Advances in Nutrition*, *3*(1), 95–104. https://doi.org/10.3945/an.111.001016

DaMota, K., Bañuelos, J., Goldbronn, J., Vera-Beccera, L. E., & Heinig, M. J. (2012). Maternal request for in-hospital supplementation of healthy breastfed infants among low-income women. *Journal of Human Lactation*, *28*(4), 476–482. https://doi.org/10.1177/0890334412445299

Deubel, T. F., Miller, E. M., Hernandez, I., Boyer, M., & Louis-Jacques, A. (2019). Perceptions and practices of infant feeding among African American women. *Ecology of Food and Nutrition*, *58*(4), 301–316. https://doi.org/10.1080/03670244.2019.1598977

Driscoll, A. K., & Gregory, E. C. W. (2020). Increases in prepregnancy obesity: United States, 2016-2019. *NCHS Data Brief*, *392*, 1–8.

Eidelman, A. I. (2012). Breastfeeding and the use of human milk: An analysis of the American Academy of Pediatrics 2012 Breastfeeding Policy Statement. *Breastfeeding Medicine*, *7*(5), 323–324. https://doi.org/10.1089/bfm.2012.0067

Feltner, C. P. W. R., Stuebe, A., Grodensky, C. A., Orr, C., & Viswanathan, M. (2018). Breastfeeding Programs and Policies, breastfeeding uptake, and maternal health outcomes in developed countries. Agency for Healthcare Research and Quality: Comparative Effectiveness Review.

FitzGerald, C., & Hurst, S. (2017). Implicit bias in healthcare professionals: A systematic review. *BMC Medical Ethics*, *18*(1), 19. https://doi.org/10.1186/s12910-017-0179-8

Flaherman, V. J., & Maisels, M. J. (2017). ABM Clinical Protocol #22: Guidelines for management of jaundice in the breastfeeding infant 35 weeks or more of gestation-revised 2017. *Breastfeeding Medicine*, *12*(5), 250–257. https://doi.org/10.1089/bfm.2017.29042.vjf

Forbes, J. D., Azad, M. B., Vehling, L., Tun, H. M., Konya, T. B., Guttman, D. S., Field, C. J., Lefebvre, D., Sears, M. R., Becker, A. B., Mandhane, P. J., Turvey, S. E., Moraes, T. J., Subbarao, P., Scott, J. A., & Kozyrskyj, A. L. (2018). Association of exposure to formula in the hospital and subsequent infant feeding practices with gut microbiota and risk of overweight in the first year of life. *JAMA Pediatrics*, *172*(7), e181161. https://doi.org/10.1001/jamapediatrics.2018.1161

Galipeau, R., Dumas, L., & Lepage, M. (2017). Perception of not having enough milk and actual milk production of first-time breastfeeding mothers: Is there a difference? *Breastfeeding Medicine*, *12*, 210–217. https://doi.org/10.1089/bfm.2016.0183

Garrison, M. P., & Maisano, P. (2019). Systematic review of factors influencing non-medically indicated formula supplementation of newborns in the hospital setting. *Nursing for Women's Health*, *23*(4), 340–350. https://doi.org/10.1016/j.nwh.2019.06.003

Gatti, L. (2008). Maternal perceptions of insufficient milk supply in breastfeeding. *Journal of Nursing Scholarship*, *40*(4), 355–363. https://doi.org/10.1111/j.1547-5069.2008.00234.x

Grassley, J. S., Schleis, J., Bennett, S., Chapman, S., & Lind, B. (2014). Reasons for initial formula supplementation of healthy breastfeeding newborns. *Nursing for Women's Health*, *18*(3), 196–203. https://doi.org/10.1111/1751-486x.12120

Grasso, C., Goldhammer, H., Thompson, J., & Keuroghlian, A. S. (2021). Optimizing gender-affirming medical care through anatomical inventories, clinical decision support, and population health management in electronic health record systems. *Journal of the American Medical Informatics Association*, *28*, 2531–2535. https://doi.org/10.1093/jamia/ocab080

Hawley, N. L., Rosen, R. K., Strait, E. A., Raffucci, G., Holmdahl, I., Freeman, J. R., Muasau-Howard, B. T., & McGarvey, S. T. (2015). Mothers' attitudes and beliefs about infant feeding highlight barriers to exclusive breastfeeding in American Samoa. *Women and Birth*, *28*(3), e80–e86. https://doi.org/10.1016/j.wombi.2015.04.002

Hennink, M., Hutter, I., & Bailey, A. (2015). *Qualitative research methods*. Sage Publications.

Hernandez-Aguilar, M. T., Bartick, M., Schreck, P., & Harrel, C. (2018). ABM clinical protocol #7: Model maternity policy supportive of breastfeeding. *Breastfeeding Medicine*, *13*(9), 559–574. https://doi.org/10.1089/bfm.2018.29110.mha

Hohl, S., Thompson, B., Escareno, M., & Duggan, C. (2016). Cultural norms in conflict: Breastfeeding among hispanic immigrants in rural Washington State. *Maternal and Child Health Journal*, *20*(7), 1549–1557. https://doi.org/10.1007/s10995-016-1954-8

Holmes, A. V., McLeod, A. Y., & Bunik, M. (2013). ABM Clinical Protocol #5: Peripartum breastfeeding management for the healthy mother and infant at term, revision 2013. *Breastfeeding Medicine*, *8*(6), 469–473. https://doi.org/10.1089/bfm.2013.9979

Hughes, V., Delva, S., Nkimbeng, M., Spaulding, E., Turkson-Ocran, R. A., Cudjoe, J., Ford, A., Rushton, C., D'Aoust, R., & Han, H. R. (2020). Not missing the opportunity: Strategies to promote cultural humility among future nursing faculty. *Journal of Professional Nursing*, *36*(1), 28–33. https://doi.org/10.1016/j.profnurs.2019.06.005

Kalmakoff, S., Gray, A., & Baddock, S. (2018). Predictors of supplementation for breastfed babies in a Baby-Friendly hospital. *Women and Birth*, *31*(3), 202–209. https://doi.org/10.1016/j.wombi.2017.08.131

Kellams, A., Harrel, C., Omage, S., Gregory, C., & Rosen-Carole, C. (2017). ABM Clinical Protocol #3: Supplementary feedings in the healthy term breastfed neonate, revised 2017. *Breastfeeding Medicine*, *12*, 188–198. https://doi.org/10.1089/bfm.2017.29038.ajk

Lutenbacher, M., Elkins, T., Dietrich, M. S., & Riggs, A. (2018). The efficacy of using peer mentors to improve maternal and infant health outcomes in hispanic families: Findings from a randomized clinical trial. *Maternal and Child Health Journal*, *22*(suppl 1), 92–104. https://doi.org/10.1007/s10995-018-2532-z

Mathews, T. J., & Hamilton, B. E. (2016). Mean age of mothers is on the rise: United States, 2000-2014. *NCHS Data Brief*, *232*, 1–8.

McCoy, M. B., & Heggie, P. (2020). In-hospital formula feeding and breastfeeding duration. *Pediatrics*, *146*(1), e20201221. https://doi.org/10.1542/peds.2019-2946

Medina Poeliniz, C., Engstrom, J. L., Hoban, R., Patel, A. L., & Meier, P. (2020). Measures of secretory activation for research and practice: An integrative review. *Breastfeeding Medicine*, *15*, 191–212. https://doi.org/10.1089/bfm.2019.0247

Neifert, M., DeMarzo, S., Seacat, J., Young, D., Leff, M., & Orleans, M. (1990). The influence of breast surgery, breast appearance, and pregnancy-induced breast changes on lactation sufficiency as

measured by infant weight gain. *Birth*, *17*(1), 31–38. https://doi.org/10.1111/j.1523-536x.1990.tb00007.x

Nelson, J. M., Perrine, C. G., Scanlon, K. S., & Li, R. (2016). Provision of non-breast milk supplements to healthy breastfed newborns in U.S. Hospitals, 2009 to 2013. *Maternal and Child Health Journal*, *20*(11), 2228–2232. https://doi.org/10.1007/s10995-016-2095-9

Nickel, N. C., Taylor, E. C., Labbok, M. H., Weiner, B. J., & Williamson, N. E. (2013). Applying organisation theory to understand barriers and facilitators to the implementation of baby-friendly: A multisite qualitative study. *Midwifery*, *29*(8), 956–964. https://doi.org/10.1016/j.midw.2012.12.001

Nommsen-Rivers, L. A., Dolan, L. M., & Huang, B. (2012). Timing of stage II lactogenesis is predicted by antenatal metabolic health in a cohort of primiparas. *Breastfeeding Medicine*, *7*(1), 43–49. https://doi.org/10.1089/bfm.2011.0007

Office of Disease Prevention and Health Promotion. (2020). Healthy People 2020 Maternal, Infant, and Child Health. https://health.gov/healthypeople/objectives-and-data/browse-objectives/infants/increase-proportion-infants-who-are-breastfed-exclusively-through-age-6-months-mich-15

Pak-Gorstein, S., Haq, A., & Graham, E. A. (2009). Cultural influences on infant feeding practices. *Pediatrics in Review*, *30*(3), e11–e21. https://doi.org/10.1542/pir.30-3-e11

Panchula, J. (2012). Working with families of different cultures I and II, lessons learned. *Journal of Human Lactation*, *3*, 16–20.

Pang, W. W., & Hartmann, P. E. (2007). Initiation of human lactation: Secretory differentiation and secretory activation. *Journal of Mammary Gland Biology and Neoplasia*, *12*(4), 211–221. https://doi.org/10.1007/s10911-007-9054-4

Parry, J. E., Ip, D. K., Chau, P. Y., Wu, K. M., & Tarrant, M. (2013). Predictors and consequences of in-hospital formula supplementation for healthy breastfeeding newborns. *Journal of Human Lactation*, *29*(4), 527–536. https://doi.org/10.1177/0890334412474719

Pierro, J., Abulaimoun, B., Roth, P., & Blau, J. (2016). Factors associated with supplemental formula feeding of breastfeeding infants during postpartum hospital stay. *Breastfeeding Medicine*, *11*, 196–202. https://doi.org/10.1089/bfm.2015.0091

Schmied, V., Gribble, K., Sheehan, A., Taylor, C., & Dykes, F. C. (2011). Ten steps or climbing a mountain: A study of Australian health professionals' perceptions of implementing the baby friendly health initiative to protect, promote and support breastfeeding. *BMC Health Services Research*, *11*, 208. https://doi.org/10.1186/1472-6963-11-208

Tender, J. A., Janakiram, J., Arce, E., Mason, R., Jordan, T., Marsh, J., & Moon, R. Y. (2009). Reasons for in-hospital formula supplementation of breastfed infants from low-income families. *Journal of Human Lactation*, *25*(1), 11–17. https://doi.org/10.1177/0890334408325821

Tervalon, M., & Murray-García, J. (1998). Cultural humility versus cultural competence: A critical distinction in defining physician training outcomes in multicultural education. *Journal of Health Care for the Poor and Underserved*, *9*(2), 117–125. https://doi.org/10.1353/hpu.2010.0233

US Department of Agriculture and US Department of Health and Human Services. (2020). Dietary Guidelines for Americans, 2020-2025. https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary_Guidelines_for_Americans_2020-2025.pdf

Victora, C. G., Bahl, R., Barros, A. J., França, G. V., Horton, S., Krasevec, J., Murch, S., Sankar, M. J., Walker, N., Rollins, N. C., & Lancet Breastfeeding Series Group. (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *Lancet*, *387*(10017), 475–490. https://doi.org/10.1016/s0140-6736(15)01024-7

Wambach, K., Domian, E. W., Page-Goertz, S., Wurtz, H., & Hoffman, K. (2016). Exclusive breastfeeding experiences among Mexican American women. *Journal of Human Lactation*, *32*, 103–111.

World Health Organization. (2011). Exclusive breastfeeding for six months best for babies everywhere. https://www.who.int/mediacentre/news/statements/2011/breastfeeding_20110115/en/#:~:text=WHO%20recommends%20mothers%20worldwide%20to,of%20two%20years%20or%20beyond

World Health Organization and UNICEF. (2018). Implementation guidance: Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services: The revised Baby-Friendly Hospital Initiative. https://www.who.int/nutrition/publications/infantfeeding/bfhi-implementation-2018.pdf

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