Breastfeeding experiences and support for women who are overweight or obese: A mixed methods systematic review

ABSTRACT

Women who are overweight or obese have increased health risks during and beyond pregnancy, with consequences for the shorter and longer-term health of their infants. Exclusive breastfeeding to six months has many benefits for women and their infants. However, women who are overweight or obese have lower rates of breastfeeding intention, initiation and duration compared to women with normal weight.

This systematic review aimed to examine evidence of i) breastfeeding and breastfeeding support experienced by women who are overweight or obese, ii) perceptions of support provided by healthcare professionals, peer supporters, partners and family members and iii) support shown to be effective in increasing breastfeeding initiation and duration among these women. Sixteen quantitative and qualitative papers were included and critically appraised. Thematic synthesis was undertaken to obtain findings. Maternal physical and mechanical barriers such as larger breasts, difficulties of positioning to breastfeed, delayed onset of lactation, perceived insufficient supply of breast milk, and impact of caesarean birth were evident. Maternal psychological barriers including low confidence in ability to breastfeed, negative body image, embarrassment at breastfeeding in public and experiencing stigma of obesity were also described. Support from healthcare professionals and family members influenced breastfeeding outcomes. Education for maternity care professionals is needed to enable them to provide tailored, evidence-based support to women who are overweight or obese.
obese who want to breastfeed. Research on healthcare professionals, partners and family members’ experiences and views on supporting women who are overweight or obese to breastfeed is needed to support development of appropriate interventions.

KEY WORDS

Breastfeeding, obesity, overweight, body mass index, breastfeeding support, breastfeeding experiences.

KEY MESSAGES

- Physical and psychological barriers to initiate and continue breastfeeding were identified among women who are overweight or obese.
- Appropriate education and training are needed for maternity care professionals on how to improve and tailor support for women with a higher body mass index to breastfeed.
- Limited research was found of healthcare professionals, partners’ and family members’ perspectives on supporting women who are overweight or obese to breastfeed.
- Further robust research, with larger sample sizes, should be prioritised given the increasing burden globally of obesity among women of reproductive age.

INTRODUCTION
Prevalence rates of obesity and overweight among women of reproductive age are increasing. In the United Kingdom (UK), the proportions of women who were overweight or obese aged 16-24, 25-34 and 35-44 were 36%, 44%, and 57% respectively in 2016 (Health and Social Care Information Centre, 2017). In the United States, 55.8% of women aged between 20-39 years had a Body Mass Index (BMI) ≥25 kg/m² (Flegal et al., 2012). Overweight and obesity present health risks during and beyond pregnancy. Women with a pre-pregnancy BMI ≥25kg/m² are significantly more likely to require induction of labour, intrapartum intervention or caesarean section (elective and emergency) (Marchi et al., 2015; Poston et al., 2016; Ovesen et al., 2011; Sebire et al., 2001). For infants of women who are overweight or obese, there are higher risks of admission to neonatal units,macrosomia (birthweight >4000g) or birthweight above the 90th centile (large-for-gestational age) (Poston et al., 2016; Marchi et al., 2015; Ruager-Martin et al., 2010; Ovesen et al., 2011; Sebire et al., 2001), and higher BMI in childhood and young adulthood (Godfrey et al., 2017).

As breastfeeding significantly reduces the risk of childhood overweight and obesity and associated diseases (Horta et al., 2015; Martin et al., 2005), breastfeeding among women who are overweight or obese and their infants is particularly important. However, women with higher BMIs are less likely to initiate, continue or exclusively breastfeed than women who have a ‘normal’ BMI (BMI between 18.5 – 25.0kg/M²) (Wojcicki, 2011; Amir & Donath, 2007; Turcksin et al., 2014; Mäkelä, et al., 2014). Other potential benefits of breastfeeding for women include support for postnatal weight management (Vinter et al., 2014, Baker et al 2008), reduced risk of ovarian and breast cancer, and type-2 diabetes (Ip et al., 2007; Horta et al., 2007; Victora et al., 2016). Exclusively breastfed infants have reduced risk of
contracting respiratory, gastrointestinal, and ear infections, in infancy compared to infants not exposed to same levels of breastfeeding exclusivity or duration (Ip et al., 2007; Eidelman et al., 2012; Victora et al., 2016). Evidence for breastfeeding support available and experienced by women who are overweight or obese is limited.

This systematic review aimed to examine evidence of i) breastfeeding practices and breastfeeding support experienced by women who are overweight or obese, ii) perceptions of support provided by healthcare professionals, peer supporters, partners and family members and iii) support shown to be effective in increasing breastfeeding initiation and duration among women with higher BMIs. The review was registered on PROSPERO: xxxxxx

METHODS

An ‘integrated methodology’ was adopted (Sandelowski et al., 2006; Joanna Briggs Institute, 2014) in which findings of qualitative and quantitative studies can confirm or refute each other, with data assimilated into one single synthesis. The review was designed to answer the following questions:

• What are perceptions and experiences of breastfeeding intention, initiation and continuation among women who are overweight or obese?

• What are these women’s experiences of support for breastfeeding offered by healthcare professionals, peer supporters and family members during and after pregnancy, including type and content of support?
• What types and content of support offered by healthcare professionals, peer supporters and family members during and after pregnancy increase breastfeeding initiation and continuation among women who are overweight or obese?

• What are healthcare professionals’, peer supporters’ and family members’ perceptions of providing breastfeeding support and how do they perceive their role in this?

Eligibility criteria

The PICOS (Population/Participants, Interventions/Phenomena of interest, Comparison/Context, Outcomes, and Study types) framework adapted from Joanna Briggs Institute (2014) was used to develop the eligibility criteria as follows. Population/Participants

Pregnant and postnatal women classed as overweight (BMI ≥ 25 kg/m²) or obese (BMI≥ 30 kg/m²) as defined by study authors, and those who offered breastfeeding support including partners, family, healthcare professionals, breastfeeding peer supporters and lactation specialists were included.

Interventions/Phenomena of interest

Studies were included if they explored experiences and perceptions of breastfeeding and breastfeeding support, evaluations of breastfeeding interventions/support, as well as studies which considered experiences, perceptions and information/training needs of those who offered support. Studies targeted at all women, irrespective of BMI, were excluded, as were
studies where the primary aim was to establish breastfeeding initiation and duration among women who were overweight or obese which did not present (a) research data on barriers or facilitators to these or (b) evaluate the intervention/support provided.

**Comparison/Context**

For experimental/quasi-experimental studies, comparisons could include usual care or a control group designed as a comparison to the described intervention. For non-experimental studies, comparisons could include women who were not overweight or obese. Studies conducted in acute and/or primary care settings, communities or participants’ homes were included.

**Outcomes**

Outcomes for intervention studies (as defined by study authors) included:

- Rates of breastfeeding initiation
- Duration of exclusive breastfeeding
- Duration of any breastfeeding

Other outcomes, including for non-intervention studies included:

- Women’s experiences and perceptions of support for breastfeeding provided by healthcare professionals, peers and family members
- Maternal and infant physical and psychological factors that affected women’s breastfeeding outcomes
- Experiences and views of those who supported women to breastfeed
- Women’s confidence, knowledge, attitudes, and skills
• Supporters’ (including professionals, peers and family members) knowledge, attitudes, and skills, their information and training needs.

• Breastfeeding problems

• Barriers to provision of interventions/support

**Study types** Experimental (e.g. randomised controlled trials, cluster-randomised trials) and quasi-experimental studies were considered. For non-intervention studies, qualitative, quantitative and mixed methods research papers presenting primary data and/or secondary data analysis using quantitative datasets were included. Reviews, dissertations, opinion pieces, guidelines and policy papers were excluded. Studies published in English from January 1992 (following the launch of UNICEF’s Baby Friendly Initiative), to October 2018 were included. Intervention studies published since January 2014 were considered as an earlier review of interventions to increase breastfeeding among women with higher BMIs only included studies up to 2013 (Babendure et al., 2015).

**Search strategy**

A search of Medline, Embase, Maternity and Infant Care, CINAHL, SCOPUS, PsycInfo, Web of Science and Cochrane Library was conducted using search terms and Medical Sub-Headings (MeSH) terms. Searches were undertaken to identify unpublished studies and reports published in grey literature sources including OpenGrey, and websites of organizations which support breastfeeding and/or weight management such as WHO, UNICEF, La Leche International league, and commercial weight management programmes. Reference lists of selected papers and identified reviews were searched for additional papers.
Initial key words and indexed terms included: obesity, overweight, breastfeeding, lactation, and support. MeSH terms were identified through reading published studies and use of the MeSH terms lookup tool in the Cochrane Library. Figure 1 shows an example of a full search strategy for Medline.

----Insert Figure 1 here----

**Study selection**

All identified papers were initially screened for relevance based on title and date published, and then further assessed by reading the abstract. Full-texts were then retrieved and assessed against eligibility criteria. Full texts were assessed by xx, xx and xx and verified by xx.

**Quality assessment and data extraction**

The Critical Appraisal Skills Programme’s (CASP) critical appraisal checklists were adapted for quality assessment of qualitative research, case control and cohort studies. A maximum score of 10 was allocated for the CASP checklist of qualitative research, 13 for case control studies, and 14 for cohort studies. In the absence of a suitable CASP checklist for cross-sectional studies, a checklist for questionnaires and surveys (Greenhalgh et al., 2005) was used, with a maximum score of 13. Quality assessment was independently conducted by xx, xx, xx and verified by xx and xx. Any disagreements were resolved through discussion. Studies which scored less than 8 on relevant appraisal tools were excluded.
Data were extracted from included studies by xx, xx, xx and xx. Xx and xx verified the extracted data and corrected where necessary. Two data extraction forms, which were adapted from the authors’ previous published systematic reviews, were used (xxx, 201x; xxx, 201x). One form is for quantitative studies and the other for qualitative studies. Data extraction for quantitative studies included aim/objectives, study design, setting, participants, inclusion/exclusion criteria, outcome measures, intervention, results, additional analysis e.g. sub-groups. Data extraction for qualitative studies included aim/phenomena of interest, methodology, setting, participants, sampling methods, data collection, data analysis, results. The key characteristics for each included paper on study aim, study methods, sample, key findings are presented in Table 1.

**Data synthesis**

In line with an ‘integrated methodology’, quantitative and qualitative data were assimilated into a single synthesis. Using this approach, studies are grouped for synthesis using findings which answer the same review questions, rather than by study methods, enabling integration of findings (Dixon-Woods et al., 2005). Findings from quantitative data were extracted narratively, ‘converted’ into themes and integrated with qualitative data. Thematic synthesis steps adapted from Lucas et al. (2007) and Smith et al. (2012) were adhered to, namely:

1. Data were extracted from findings of included studies
2. Extracted data were grouped for each review question and emergent themes identified
3. A list of themes was presented for each question.
4. A synthesis of findings was produced.
Due to differences in quantitative study designs and outcomes, meta-analysis could not be performed.

RESULTS

Selection and quality appraisal

Following the initial systematic search on 2nd September 2017, 2,591 publications were identified (Figure 2). After removing duplicates, 1,518 remained. Titles were screened for relevance after which 220 abstracts were obtained for further screening by xx and xx. Following title and abstract screening, 51 full texts were retrieved and read by xx and xx. Forty papers were excluded which did not address the review questions. Reference lists of selected papers and relevant reviews were searched and seven further papers identified. Searches were updated on 23rd October 2018 and three additional articles were selected for quality assessment. Quality assessment was conducted for a total of 21 papers using the appropriate critical appraisal checklist. Following quality assessment, five papers were excluded (Katz et al., 2009; Newby and Davies, 2016; Rasmussen et al., 2006; Zanardo et al., 2014; Lewkowitz et al., 2018) due to poor quality of data presented. Quality assessment scores of the final included papers are included in Table 1.

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----Insert Table 1 here ---
Sixteen papers were included: six qualitative studies, six prospective cohort studies, one retrospective cohort study, one case control study and two cross sectional studies. Two papers (Garner et al., 2017, McKenzie et al., 2018) were from the same study. All papers were from high income countries; ten from the USA, two from UK, with single papers from France, New Zealand, Singapore and Sweden. One paper focused on healthcare professionals, all others explored women’s experiences of breastfeeding, perceptions of support offered, perceptions of body image, breastfeeding practices and views of barriers to breastfeeding.

Only two papers (Garner et al., 2014; McKenzie et al., 2018) achieved a full CASP score of 10. The other studies had methodological limitations, including exposure variables which may not have been accurately measured to minimise bias (Jarlenski et al, 2014; Kair & Colaizy, 2016a, Nommsen-Rivers et al., 2010, Hauff et al., 2014, Hauff and Demerath, 2012, O’Sullivan et al., 2015). Two qualitative studies (Keely et al., 2015, Garner et al., 2017) were allocated lower scores as the relationship between researcher and study participants was not explained.

FINDINGS

What are perceptions and experiences of breastfeeding intention, initiation and continuation among women who are overweight or obese,?

Included studies reported many physical and psychological barriers to breastfeeding among women with higher BMIs, which are considered in the following sections.
Positioning and attaching to the breast

Quantitative and qualitative studies reported physical barriers including larger breasts, bigger areolas and additional body tissue, made infant handling and breastfeeding positions such as cradle or cross cradle, more difficult (Jarlenski et al., 2014; Massov, 2015; Garner et al., 2017; Claesson et al., 2018). Jarlenski et al (2014) found that significantly more women with obesity (26.5%) than without obesity (21.0%) (p<.05) reported ‘baby had trouble sucking or latching on’ as a reason for not breastfeeding to six months (Jarlenski et al., 2014).

Garner et al’s (2017) qualitative study further found that women with obesity reported breastfeeding took more time, including preparing to feed, and required more physical ‘props’, such as pillows, limiting places where they felt able to breastfeed outside of the home. Finding nursing bras to fit was also identified as a problem for them. Additionally, Massov (2015) reported women’s concerns that as their breasts were heavy, they worried they would suffocate their infant by ‘squishing’ them.

Breast problems

In a matched case-control study from France (Mok et al., 2008), a significantly higher proportion of women with obesity (56.7%) reported physical difficulties with breastfeeding (i.e. cracked nipples, fatigue or difficulty initiating a breastfeed) in hospital, compared to normal BMI women (13.3%) (p<.05). Kair and Colaizy (2016a) reported findings from a large retrospective cohort study of women’s reasons for stopping breastfeeding in the USA. Compared to women with normal weight who breastfed, women with obesity had significantly higher odds of reporting sore, cracked or bleeding nipples (OR=0.70, 95%CI[0.54, 0.91], p=.008), and lower odds of reporting that they stopped breastfeeding...
when they felt it was the best time for them to stop (OR=0.69, 95%CI[ 0.49, 0.96], p=.028), which suggested their desire to breastfeed for a longer duration.

**Delayed onset of lactation and perceived insufficient breast milk**

Being overweight or obese was an independent risk factor for delayed onset of lactation (Nommsen-Rivers et al., 2010), with ‘delayed’ defined as breasts being “noticeably fuller” after 72 hours postpartum. Women’s perceptions of insufficient breastmilk supply has been reported as a key factor for stopping breastfeeding (Mok et al., 2008; Jarlenski et al., 2014; Kair & Colaizy 2016a; Massov 2015; O’Sullivan et al., 2015). For example, Jarlenski et al. (2014) reported perceptions of low breastmilk supply as a reason for early cessation among women with and without obesity, with more women with obesity (55.5%) reporting this than women without obesity (48.3%) (p<.05). "Did not have enough milk" was the second most common reason provided in both groups, but significantly more women with obesity (51.3%) reported this than women without obesity (45.0%) (p<.05). The women in Massov’s (2015) study described perceived insufficient breast milk supply as a reason for switching to formula feeding. Claesson et al.’s (2018) qualitative study described how women thought that having larger breasts might impair milk production. O’Sullivan et al. (2015) found that obesity negatively affected exclusive breastfeeding, and the association was significantly mediated by the perception of ‘insufficient milk’ supply.

**Impact of caesarean birth**
Having a caesarean birth was identified as a specific barrier for women with obesity to breastfeed (Keely et al., 2015; Garner et al., 2014; Garner et al., 2017). Women who had a caesarean birth considered that anaesthetic drugs made it harder for them to think and react properly in the post-operative period, and that caesarean birth delayed skin to skin care, presenting a barrier to breastfeeding initiation (Keely et al., 2015). Women’s limited mobility following a caesarean birth was reported as a perceived barrier to breastfeeding by clinicians interviewed by Garner et al. (2014), and experiences of poor post-caesarean health and recovery (such as developing severe infections) were described as barriers by women with obesity (Garner et al., 2017).

*Attitudes and low confidence in ability to breastfeed*

Hauff et al (2014) showed maternal BMI was significantly associated with maternal confidence in achieving breastfeeding duration goals (*p*<.0001). A higher proportion of women with obesity (10.3%) rated they were ‘not confident’ in their ability to breastfeed for as long as planned, compared to women with overweight BMIs (8.8%) or normal BMIs (5.4%). Women who were not confident they would achieve their breastfeeding goals were significantly more likely to stop breastfeeding earlier than women who were confident (HR: 2.50 95%CI [2.07, 3.02]). However, maternal attitudes and beliefs towards breastfeeding were not significantly different among women with normal, overweight or obese BMIs (*p*=.40). Similarly, Lau et al (2017) found that attitudes to breastfeeding were comparable among women with normal and overweight/obese BMIs(*p*=.851) in their study.

*Body image*

Two studies (Hauff & Demerath, 2012; Swanson et al., 2017) investigated the relationships between women’s perceptions of body image and breastfeeding. Hauff & Demerath (2012) found that women who were overweight or obese were significantly more likely to report not
feeling body confident (50%, n=38) at four months postnatally, compared with 28.5% (n=45) of women with normal BMIs (p=.001), and feeling body confident was significantly associated with both exclusive (p<.001) and any breastfeeding (p<.001) at 4-months postpartum. Women’s lack of body comfort/confidence was found to significantly mediate the relationship between maternal obesity and reduced duration of any breastfeeding. Swanson et al., (2017) reported that women’s perceptions of their body image was relatively low for all women in the postpartum period, but women with obesity were found to have significantly lower body satisfaction at 6-8 weeks postpartum than healthy weight comparisons (p=.03). Body satisfaction was found to significantly mediate the relationship (p=.002) between weight status and any breastfeeding at 6-8 weeks.

Breastfeeding in public

Embarrassment about breastfeeding in public was a key issue affecting breastfeeding behaviour (Mok et al., 2008; Massov, 2015; Keely et al., 2015; Claesson et al., 2018; McKenzie et al., 2018). Mok et al. (2008) reported that at one month postpartum, a higher proportion of women with obesity (47%, n=20) reported feeling uncomfortable when breastfeeding in the presence of others than women with normal weight (26%, n=13), but this was not statistically significant. However, at three months postpartum, significantly more women with obesity (42%) continued to report this, compared to women with normal body weight (13%) (p<.01).

A woman in the study by Massov (2015) directly attributed lack of breastfeeding success due to her inability to be discreet when breastfeeding in public as her breasts were so large: ‘Yes,
me personally, I'm just too self-conscious to, because they're so big, to actually get them out in public’ (Massov 2015, p.26). Keely et al. (2015) reported feeding in public was a source of anxiety for women, and women who decided to bottle feed felt comforted at not having to reveal their bodies. The open postnatal ward environment with a constant stream of visitors offered little privacy. The women who had a caesarean birth and required longer in-patient stay, found breastfeeding distressing due to a lack of privacy when sharing a room with other women, their partners and visitors. Problems with privacy persisted at home, due to well-intentioned frequent visits from family members and friends, as women faced the same potential for embarrassment at having to expose their bodies in front of them (Keely et al., 2015). Nevertheless, for some women the awkwardness of breastfeeding around others could reduce over time: ‘now that [infant] can just latch on and eat, I don’t feel nearly as self-conscious (McKenzie et al., 2018, p.764).

Stigma associated with obesity

Hauff and Demerath (2012) reported stigma of obesity as a direct cause of poorer breastfeeding behaviours, including reduced duration. Kair and Colaizy (2016b) suggested that women who were overweight or obese were less likely to receive pro-breastfeeding support in hospital than women with normal weight as a consequence of obesity stigma among hospital staff.

What are experiences of support for breastfeeding offered by healthcare professionals, peer supporters and family members during and after pregnancy among women who are overweight or obese, including type and content of support?
Studies of support for breastfeeding described women’s positive and negative experiences of support offered and received.

**Social knowledge and support**

Hauff et al. (2014) found a significant association between maternal BMI status and social knowledge of breastfeeding i.e. how many of women’s friends or relatives had previous breastfeeding experience. Women with obesity were less likely to know any women with previous breastfeeding experience (18.7%) or knew only 1-2 women with previous experience (23.6%), when compared to women with overweight BMIs (13.7% and 21.7% respectively) or normal BMIs (11.4% and 20.9% respectively). Women in Keely et al.’s (2015) study commented that their partners did not understand the frequency with which infants required feeding, and expressed concerns that infants were not receiving adequate breast milk ‘I don’t think [my husband] quite understood about the breastfeeding – that it is normal every half an hour and it is normal for [the baby] to cry.’ (p.536).

**Healthcare professionals’ attitudes and practices**

Kair and Colaizy (2016b) found the amount of breastfeeding support offered by health professionals differed according to women’s BMI category. Compared to women with normal BMIs, in unadjusted models, women with obesity had lower odds of a staff member offering them information about breastfeeding (OR=0.71, 95% CI [0.57,0.89], p=.002), a staff member helping them to breastfeed (OR=0.69,95% CI [0.61,0.78], p<.001), breastfeeding within an
hour of the birth (OR=0.55, 95% CI [0.49,0.62], p<.001), being offered a telephone number for breastfeeding help (OR=0.65, 95% CI [0.57,0.74], p<.001), rooming in with their baby (OR=0.84. 95% CI [0.73,0.97], p=.02) or being informed to breastfeed on demand (OR=0.66, 95% CI [0.58,0.75], p<.001). All associations remained significant after adjusting for multiple covariates, except the association for ‘rooming in’. Jarlenski et al. (2014) found no differences between women with and without obesity in reporting that their physicians (p=.93) and other healthcare professionals (p=.51) supported/favoured exclusive breastfeeding.

Women found it helpful to receive regular home contacts with healthcare professionals. Keely et al. (2015) reported feedback from one woman who felt that the regular home contacts she received from a clinical assistant were vital to establishing a good breastfeeding routine. Women’s self-confidence increased when health professionals paid attention to them and that they were treated as an individual rather than an individual with obesity ‘they looked into my eyes and saw me as I was. Nobody focused on what I looked like...’ (Claesson et al., 2018:7).

However, some women received judgemental and disempowering support from healthcare professionals. Massov (2015) reported one woman with obesity who experienced ‘rough and aggressive’ treatment: ‘I remember the midwife coming in and almost angry that I was upset because I was having trouble doing it...’ (p.27). Another woman reported her experience of midwifery support as disempowering, as rather than showing her how to attach her baby to the breast, she felt midwives ‘were taking over’ (p.27). Lacking support from health professionals was found to be a reason for stopping breastfeeding (Claesson et al.’s 2018).
What types and content of support offered by healthcare professionals, peer supporters and family members during and after pregnancy increase breastfeeding initiation and continuation among women who are overweight or obese?

**Type and content of support from healthcare professionals**

Jarlenski et al. (2014) found an association between healthcare professionals’ support/favour for/of exclusive breastfeeding and overall breastfeeding initiation and duration. In the overall sample, after adjusting for covariates, healthcare professionals’ support/favour (defined as ‘physicians’ and ‘non-physicians’) for/of exclusive breastfeeding was associated with an 8.5% increased probability of breastfeeding initiation (95% CI [6.3-10.7], p<.01 and a 13.2% increase in probability of continuing breastfeeding to 6 months or longer (95% CI [9.1,17.3], p<.01), independent of whether women were with or without obesity.

**Type and content of support from partners, family members and friends**

The influence of partners, family members and friends on breastfeeding outcomes was explored by Mok et al. (2008) and Keely et al. (2015). Mok et al. (2008) reported that a woman’s choice of how to feed her infant was influenced by feeding practices of close family members, as well as her partner’s opinion. Keely et al (2015) confirmed that close family were an important source of practical support and influence on decisions to continue breastfeeding, especially if a relative had previously successfully breastfed. Conversely, a woman’s partner could influence a woman’s decision to introduce formula milk, often in response to breastfeeding problems: ‘He kept saying, ‘Just ...
if it’s that sore ... just stop, because it’s not the end of the world’. He was like, ‘There’s no point torturing yourself for it’ (p.536).

What are healthcare professionals’, peer supporters’ and family members’ perceptions of providing breastfeeding support and how do they perceive their role in this?

Only one paper presented perspectives of relevant healthcare professionals (Garner et al., 2014). Some described multiple challenges, with women’s care described as “hugely time-consuming” (p.506) due to obesity-related comorbidities, women’s more limited mobility, increased physical effort and need for more frequent breastfeeding assistance: “We dread those patients” because “it’s so hard to take care of them” (p.507). They perceived women’s lack of confidence as major psychosocial barriers to breastfeeding, and large breasts as a major physical challenge. Healthcare professionals described awareness of obesity stigma and efforts to be sensitive including “using gentle language and asking permission to touch” (p.507). Nevertheless, it was clear that obesity caused embarrassment in the patient/healthcare professional relationship, with implicit stigma in the way professionals communicated with women with obesity or responded to their questions (Garner et al., 2014). They claimed to treat all women the same way but breastfeeding discussions with women with obesity were frequently not a priority. They considered that more education on how to support women with obesity to breastfeed was required, and highlighted care could be improved by better preparing women for breastfeeding during pregnancy, including positions for breastfeeding. Possible benefits of providing postnatal home contacts were also
mentioned. No studies were identified which had specifically described peer supporters, family members or partners’ perceptions.

DISCUSSION

This review examined both qualitative and quantitative evidence of breastfeeding practices and breastfeeding support experienced by women who are overweight or obese, their perceptions of support they received and what type of support impacted on breastfeeding initiation and duration. The perceptions of those who supported women to breastfeed were also considered. Sixteen papers were included, all from high income countries. Only two studies (Garner et al., 2014, McKenzie et al., 2018) achieved a full quality assessment (e.g. CASP) score. Findings highlighted that breastfeeding support for women with higher BMIs is a complex, multi-factorial issue which if women’s needs are to be met, has to take account of physical, physiological and psychological challenges and system factors including postnatal ward environment and clinical education.

Physical and physiological challenges

The findings of this current review echo many of the physical and physiological challenges identified by Babendure et al. (2015). Babendure et al. (2015) investigated factors that reduced breastfeeding incidence, duration and exclusivity and evaluated interventions to increase breastfeeding among women with obesity (BMI ≥30 kg/m²). Our review, which also
included studies of women who were overweight (BMI ≥ 25 kg/m²), provides additional qualitative evidence to better place findings into context of the type of support and environment of care which could benefit women with higher BMIs. Physical challenges such as women having larger breasts and difficulties with attaching their babies to the breast impacted on their breastfeeding success (Massov, 2015; Jarlenski et al, 2014; Garner et al., 2017, Claesson et al., 2018). This, combined with lack of practical support from healthcare providers (Garner et al 2014; Kair & Colaizy 2015b; Claesson et al., 2018), highlights an important gap in how women are informed about positions to commence feeding.

As chances of spontaneous vaginal birth diminish with increasing BMI (Leddy et al., 2008, Nilses et al., 2017), clinician training to provide tailored breastfeeding support in hospital and at home should be a priority for all maternity care providers. Poor support generally for breastfeeding following caesarean birth was highlighted in a recent systematic review (Beake et al., 2017). The current review contributes further evidence, that women with high BMIs who have caesarean births not only have problems with mechanical aspects of breastfeeding but consequences of post-operative recovery in hospital environments where clinicians may be unable – or unwilling - to offer the support and advice they need, or protect their privacy. Tailored support could also prevent women from developing sore, cracked nipples, which were more common among higher BMI women (e.g. Kair & Colaizy, 2016a).

Several studies (Mok et al., 2008; Jarlenski et al., 2014; Kair & Colaizy, 2016a; Massov, 2015; O’Sullivan et al., 2015; Claesson et al.,2018) reported that women who were overweight or obese were more likely to report insufficient breastmilk as a reason for early cessation of breastfeeding than women with normal BMIs. This is one of the most commonly reported
reasons for early cessation generally in high income country settings, including Australia, UK and Canada (Health and Social Care Information Centre 2012; Newby & Davies 2016; Brown et al., 2014), and may be an indicator of other reasons for stopping breastfeeding, as insufficient milk of itself is unlikely if women are breastfeeding effectively. However, the included studies did not fully explore this reason or define what ‘insufficient breastmilk’ actually meant. Reasons for stopping breastfeeding are likely to be complex, and ‘insufficient milk’ may seem to be a more socially acceptable reason that women feel able to report. The issue of insufficient milk warrants further investigation among all breastfeeding women, but particularly for women with higher BMIs. It is not known to what extent perceived lack of breast milk in these women reflects physiological reasons (for example, differences in adipose tissue), compounded by poor infant sucking due to mechanical barriers, such as poor latching and positioning on large breasts, and/or a consequence of inadequate postnatal support and information.

There is evidence that women in some cases do experience delayed onset of lactation (DoL). DoL was explored in one included paper which found BMI, larger infant birthweight and older maternal age were associated with DoL (Nommsen-Rivers et al., 2010). Obesity as a predictor of delayed lactogenesis II (the onset of copious milk production) was found in in a later study by Preusting et al.(2017), and although not a focus of this review, further research into better understanding reasons for DoL are urgently needed. Medical complications such as caesarean birth or prolonged labour could inhibit oxytocin, a crucial hormone triggering lactation onset, with a potential link between lactogenesis and decreased insulin production. Further investigation into physiological differences which may exist because of higher BMIs and/or mode of birth is needed. In the interim, tailored, timely and individualised breastfeeding
support, including advice on expressing/pumping breastmilk, should be offered to women with higher BMIs to prevent potential DoL particularly following a caesarean birth.

Psychosocial challenges

As in Lyons et al.’s (2018) review of the association between psychological factors and breastfeeding behaviour, psychosocial barriers to breastfeeding were also identified from women’s perspectives, most notably women’s perceived poor body image (Hauff & Demerath, 2012; Mok et al., 2008; Massov, 2015; Keely et al., 2015; Swanson et al., 2017).

Body image appears to be an important factor if considering challenges to increase breastfeeding initiation and duration among women with higher BMIs (Hauff & Demerath 2012; Swanson et al., 2017). Embarrassment at breastfeeding in public influenced some women to choose formula feeding (Massov, 2015; Keely et al., 2015; Hauff & Demerath, 2012; Claesson et al., 2018; McKenzie, 2018). In Western societies, where there is a media obsession with post-birth bodies of celebrities, women who are overweight or obese may be even less keen to expose parts of their body to breastfeed in front of others (Hauff & Demerath, 2012) due to stigma about their body image. As images of women breastfeeding are unlikely to include women with higher BMIs, ‘normalising’ breastfeeding among these groups may be difficult to achieve. This highlights that clinicians need to prioritise timing and content of support offered which addresses stigma or embarrassment they or the woman may feel.

It is possible that women who could benefit from tailored support for breastfeeding are reluctant to seek help because of concerns about the stigma of their weight; a similar situation to perinatal mental health where women have described being reluctant to report mental
health problems because of being perceived as ‘bad mothers’ (Moore et al., 2016). Attention needs to be given to the education of maternity care professionals, including strategies on how to avoid stigmatising women, development of effective communication skills, and evidence of why breastfeeding is so important for maternal and infant health. Research into how education on obesity can be best provided and supported by those on pre and post-registration clinical training programmes in higher education institutions is needed (Olander & Scammell, 2015).

Women’s attitudes and confidence in their ability to breastfeed was also important (Hauff et al, 2014). Intervention studies aiming to improve breastfeeding rates among women with obesity by increasing self-efficacy (aka confidence) were unsuccessful (Chapman et al., 2013), and it is clear that interventions that address the multi-faceted challenges of breastfeeding as identified in this review are needed.

**Impact and success of support offered**

Another aim of the current review was to consider the impact and success of support offered to women who were overweight or obese by healthcare professionals, peer supporters and family members. The beneficial effect of positive support was described (Keely et al., 2015; Claesson et al., 2018) as was the effect of negative support (Massov, 2015; Claesson et al., 2018). The findings highlight that support has to be tailored to women’s individual needs. Women with higher BMIs were less likely to seek support despite experiencing greater breastfeeding problems (Mok et al., 2008). If negative attitudes are encountered, the likelihood of seeking the health support they need is likely to reduce further. In terms of
practical support, advice that larger beds and chairs be used postnatally to help women who are overweight or obese find a comfortable, successful breastfeeding position could be considered (Jevitt et al., 2007), as could use of breastfeeding support plans tailored to individual women’s needs.

Women’s partners may reaffirm perceptions of insufficient breast milk supply through a desire to support a woman who is anxious or upset and actively encourage her to stop breastfeeding (Keely et al., 2015). Partner support is crucial to women’s decisions about infant feeding (Littman et al., 1994), and involvement of partners in antenatal discussions on infant feeding could reduce well-intentioned but negative influences. No research was identified for inclusion in this review which addressed partners’ and family’s views, an important evidence ‘gap’ in terms of supporting women with higher BMIs.

Women with high BMIs received insufficient breastfeeding information and support (Massov 2015; Keely et al., 2015; Kair and Colaizy, 2016b; Claesson et al., 2018). Too few interventions have been developed, implemented and evaluated on support for breastfeeding among women with medically complex pregnancies, and no intervention studies published since 2014 were identified for inclusion in this review. A Cochrane review of interventions to support breastfeeding in healthy breastfeeding women and healthy term babies (which excluded women with overweight or obesity) found that when breastfeeding support was offered, duration and exclusivity of breastfeeding increased (McFadden et al., 2017).
The current review included experiences and perceptions of women with BMIs $\geq 25$ kg/m$^2$, those who supported them, and updated searches for relevant intervention studies published since 2014. However, no new intervention studies met the review’s inclusion and quality assessment criteria. We were also unable to identify and include any studies which had investigated family members’ and breastfeeding peer supporters’ experiences and perceptions. Only one study (Garner et al., 2014) which explored perspectives from healthcare professionals was included.

Most of the studies included had methodological limitations meaning some caution has to be applied to findings. Furthermore, findings may not be generalisable for several reasons. In majority of the included studies, women’s BMIs were classified according to self-reported weight and height which may not be as accurate as measured by study teams. Exclusion of non-English language studies may have introduced selection bias. Nine papers were from the USA, a potential limitation given differences in populations, cultural attitudes to breastfeeding, settings and context of care.

CONCLUSION
This review highlights the importance of planned, tailored support during and beyond pregnancy to enable women who are overweight or obese to commence and continue to breastfeed successfully and overcome barriers they encounter. Unless women with high BMIs can access timely, tailored and consistent support from maternity care professionals and their peers, uptake and duration of exclusive breastfeeding may continue to be lower to the continued detriment of maternal and infant health. That some healthcare professionals resented the extra support and time needed by women with higher BMIs needs to be urgently addressed by healthcare institutes and higher education institutions. The weakness of the evidence base highlights that further robust research, with large sample sizes, should be prioritised given the increasing burden of obesity among women of reproductive age worldwide.

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