


BMJ Open Peripartum care of persons with obesity: a scoping review of recommendations and practical tools for implementation

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ABSTRACT

Objective Despite the growing prevalence of obesity among reproductive aged persons in the USA, evidence-based guidelines for peripartum care are lacking. The objective of this scoping review is to identify obesity-related recommendations for peripartum care, evaluate grades of evidence for each recommendation, and identify practical tools (eg, checklists, toolkits, care pathways and bundles) to support their implementation in clinical practice.

Data sources We searched MEDLINE, EMBASE, CINAHL, the Cochrane Central Register of Controlled Trials and ClinicalTrials.gov from inception to December 2020 for eligible studies addressing peripartum care in persons with obesity.

Study eligibility criteria Inclusion criteria were published evidence-rated recommendations and practical tools for peripartum care of persons with obesity.

Study appraisal and synthesis methods Pairs of independent reviewers extracted data (source, publication year, content and number of recommendations, level and grade of evidence, description of tool) and identified similarities and differences among the articles.

Results Of 18315 screened articles, 18 were included including 7 articles with evidence-rated recommendations and 11 practical tools (3 checklists, 3 guidelines, 1 care bundle, 1 flowchart, 1 care pathway, 1 care map and 1 protocol). Thirteen of 39 evidence-rated recommendations were based on expert opinion. Recommendations related to surgical antibiotic prophylaxis and subcutaneous tissue closure at caesarean delivery received the highest grade of evidence. Some of the practical tools included a checklist from the USA regarding anticoagulation after caesarean delivery (evidence-supported recommendation), a bundle for surgical site infections after caesarean delivery in Australia (evidence did not support recommendation) and a checklist with content for several aspects of peripartum care from Canada (evidence supported seven of nine definitive recommendations).

Conclusion The recommendations for peripartum care for persons with obesity are based on limited evidence and few practical tools for implementation exist. Future work should focus on developing practical tools based on high-quality studies.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ We may not have identified all articles with evidence-rated recommendations, though our search of available published literature was thorough including a search of appropriate web sites.
- ⇒ Sites may have practical implementation tools that they use in the short term or long term, but they may not be published or available in a more public domain.
- ⇒ Although topics such as contraception and postpartum weight management are important in the postpartum care of persons with obesity, they were not specifically addressed in this review, which pertained to peripartum care in the immediate postpartum period.
- ⇒ Obesity was typically defined according to a body mass index (BMI) ≥ 30.0 kg/m², but in many instances the timing of the BMI was not provided (eg, prepregnancy vs at delivery).
- ⇒ We did not include recommendations that were intended for patient education only in this review.

INTRODUCTION

Obesity has reached epidemic proportions in the USA.¹ In 2015–2016, non-Hispanic black (54.8%) and Hispanic (50.6%) women had the highest prevalence of obesity and 36.5% of reproductive age women (20–39 years) had obesity (body mass index, BMI ≥ 30.0 kg/m²), translating to a high percentage of persons with obesity during future pregnancies and race-ethnicity health disparities.² Of further concern, over 50% of persons with obesity exceed guidelines for weight gain during pregnancy, thus compounding their risks for adverse outcomes.^{3–5} Adverse peripartum outcomes associated with obesity include caesarean delivery, infection, haemorrhage, venous thromboembolism (VTE) and anaesthesia-related complications, such as failure of regional anaesthesia and respiratory depression.⁶ These adverse outcomes are amplified in persons with a BMI ≥ 50 kg/m².⁷

Furthermore, obesity is cited as a contributing factor in over 50% of maternal deaths.⁸

Adaptations to prenatal care for persons with obesity include early screening for diabetes and limiting weight gain to 11–20 pounds.⁹ However, more evidence-based studies for peripartum care of persons with obesity, where the risk for adverse outcomes is a significant concern, are needed. For example, the National Institute for Health and Care Excellence performed evidence-based reviews for the intrapartum management of obesity in 2019 and found no clinical evidence to suggest that the management of fetal monitoring or maternal positioning in labour should be altered.¹⁰ Even fewer studies and evidence-based recommendations are available for those with a BMI ≥ 50 kg/m², who are at even higher risk for adverse outcomes.

Strategies that have reduced adverse outcomes in obstetrics include the development of checklists or toolkits after identifying patient, provider and systems factors for improvement in the care pathway.¹¹ Given the increasing incidence of obesity and obesity-related complications, it is critical to identify opportunities to improve the safe delivery of peripartum care.

Objectives

The objective of this scoping review is to identify obesity-related recommendations for peripartum care, evaluate levels or grades of evidence for each recommendation, and identify practical tools such as checklists, toolkits or other comprehensive care pathways to support their implementation in clinical practice. In this scoping review, we were specifically interested in recommendations that pertained to actionable items such as a treatment or decision option or a specialised consultation.

METHODS

Eligibility criteria, information sources, search strategy

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews checklist was used in developing and reporting this scoping review.¹² The inclusion criteria were: (1) published (in print or online) recommendations along with levels or grades of evidence for the peripartum care of persons with obesity (BMI ≥ 30.0 kg/m²), and if possible, specifically for persons with a BMI ≥ 50 kg/m² or (2) published (in print or online) description of a tool such as a checklist, toolkit or comprehensive care pathway for the peripartum care of obesity. We defined peripartum care to refer to care immediately before, during and after delivery, approximately 24 hours before and after delivery. To be included in the review, the identified recommendations needed to focus on actionable items or management strategies, as opposed to being a listing of comorbidities or risks that are associated with obesity in pregnancy. Actionable items might include giving or withholding a particular medication or device. Recommendations that exclusively related to ‘patient counselling’ or imparting of knowledge to

the patient were not included as the interpretation of counselling can have different meanings depending on the clinical setting (eg, location of clinical practice, provider type). The recommendations could have been abstracted from articles pertaining to obesity alone, or other articles that specified recommendations pertaining to obesity (eg, antibiotic use in pregnancy with a specific adaptation for persons with obesity). Because recommendations could be published from varying healthcare systems and there were no restrictions placed on country of origin (eg, national guidelines from USA vs UK), variances in evidence grading were identified and abstracted according to the healthcare system’s grading method.

We searched PubMed MEDLINE, Embase (embase.com), Cochrane Central Register of Controlled Trials (Wiley), CINAHL (EbscoHost) and ClinicalTrials.gov from inception to December 2020, with no date or language restrictions. The search for eligible studies involved controlled vocabulary (MeSH headings and thesauri of relevant databases) and the keywords of obesity, morbid obesity, super morbid obesity, guidelines, recommendations, checklist, toolkit, maternal care pathway, peripartum care and pregnancy. The bibliographies of relevant reviews were handsearched, as well as key websites including Google Scholar. A full list of the sources and search strategies is outlined in online supplemental appendix A.

Patient and public involvement

Patients were not directly involved in the design of this study.

Study selection

The questions for this scoping review were: (1) What are the recommendations for peripartum care of persons with obesity published by either individual authors, national societies or other government departments that provide levels or grades of evidence to support the recommendation? and (2) What are the published tools for practical implementation of recommendations, either in the form of checklists, toolkits or other comprehensive care pathways?

The primary outcomes were the number of recommendations per article, topic of recommendation, level or grade of evidence to support recommendations and similarities and differences between the recommendations across articles. For the identified checklists, toolkits or other comprehensive care pathways for the peripartum management of obesity, their details were summarised and crosschecked with the aforementioned recommendations.

Data extraction

Four reviewers independently screened all citations using the Covidence review management software.¹³ Initially, the reviewers were trained on a sample of 20 articles using the Covidence software to verify clarity and consistency regarding inclusion and

exclusion criteria. A separate, fifth reviewer resolved all conflicts. Once agreement was obtained on articles meeting criteria for final inclusion, two reviewers independently extracted the following data from each article using a form that was tested and modified by the reviewers, as applicable: (1) source of recommendations (eg, individual authors, national societies), (2) year of publication, (3) content and total number of recommendations, (4) level and grade of evidence for each of the recommendations, (5) system used to determine levels of evidence or classification of recommendations and (6) description of checklist, toolkit, comprehensive care pathway or other format used for implementation in the peripartum care of obesity. If articles were in abstract form only, we contacted the authors for updates on the status of the final publication.

Data synthesis

The data were summarised and abstracted into table format, noting key similarities and differences among the articles in terms of content and level and grade of evidence. For the identified checklists, toolkits, etc similarities and differences among the content were highlighted. For this scoping review, we did not assess the effectiveness of the findings or evaluate bias. The scoping review protocol is published at <https://doi.org/10.18131/g3-gyms-ww23>.

RESULTS

Study selection

After removal of duplicates, 18 328 articles were screened, resulting in 203 articles for full-text review. **Figure 1** shows the flow diagram for study selection. A total of 7 evidence-rated articles and 11 tools met inclusion criteria for this review. The majority (n=8) of the tools were selected from the results of Google Scholar searches.

Study characteristics

Table 1 displays the title, year of publication, source of recommendations and references for evidence levels and grades for seven articles identified from the search of all databases. The publication years ranged from 2015 to 2020 representing three countries (USA, UK and Canada) and one international guideline. Publication topics included VTE, antibiotic prophylaxis, as well as the broad-spectrum of peripartum care. For these articles, the content was either exclusively focused on the management of obesity or the content was about a high-risk condition during pregnancy and addressed obesity among other issues. **Table 2** displays the topic, content of the recommendation, and evidence levels and grades for each recommendation from the seven articles in **table 1**. For the tools, **table 3** displays the title, year of publication, source of recommendations and content topic for the peripartum management of obesity identified from searches of PubMed MEDLINE, Embase, Cochrane Central Register of Controlled Trials and CINAHL (n=3).

Online supplemental appendix B displays the same information identified from a search of key websites and Google Scholar for tools (n=8). We found a wide range of tools including checklists, bundles, flow charts, guidelines, protocols, care pathways and care maps from practices in the USA, Canada and the UK.

Synthesis of results

The evidence-rated recommendations covered topics such as labour induction (eg, indication and timing), intravenous access, fetal monitoring (eg, scalp electrodes, intrauterine pressure catheters IUPC), management of the first and third stages of labour, breast feeding and system-related preparedness. Several recommendations were specific to caesarean delivery (eg, incision type, antibiotic prophylaxis and dose, subcutaneous tissue closure, negative pressure dressings and VTE prophylaxis) and anaesthesia (eg, consultation, early placement of an epidural catheter). In several instances, recommendations for persons with obesity did not differ from recommendations for persons without obesity (eg, antibiotic prophylaxis for caesarean delivery).¹⁴ Three articles had one recommendation^{15–17} and the highest number of recommendations was 11 in a single article.¹⁸ The FIGO (International Federation of Gynecology and Obstetrics) Pregnancy and Non-Communicable Disease Committee published guidelines for the management of prepregnancy, pregnancy and postpartum obesity. Their recommendations for peripartum management (n=11) were included in this analysis, but it should be noted that the recommendations were not unique to the article, but instead they were abstracted from previously published international articles.¹⁸

The recommendations that were of the highest grade (strong, level 1 or grade A) were antibiotic prophylaxis for caesarean delivery,^{14 18} higher dosage of preoperative antibiotics for caesarean delivery^{16 19} and subcutaneous tissue closure.^{9 14} We noted that 13 recommendations were based on expert opinion or the lowest level of evidence. We noted that topics such as antibiotic prophylaxis (n=4 recommendations),^{16 18 19} subcutaneous skin closure (n=4 recommendations)^{9 14 19} and VTE prophylaxis (n=8 recommendations)^{9 15 18 19} were most commonly addressed. There were two instances where a particular intervention was not recommended (eg, subcutaneous drains, negative pressure dressing therapy).^{9 14} We did not find any recommendations that directly opposed one other, but there were differences in the specifics of the recommendations. For example, the American College of Obstetricians and Gynecologists recommends an anaesthesiology consult for persons with both obesity and obstructive sleep apnoea whereas the Royal College of Obstetricians and Gynaecologists (RCOG) recommends that the anaesthetist 'be informed of all women with class III obesity'.^{9 14} In one guideline from the Society of Obstetricians and Gynaecologists of Canada (SOGC), the recommendation is for a 'higher' dose¹⁹ and another recommendation from the SOGC is for a 'double dose'¹⁶ of antibiotic

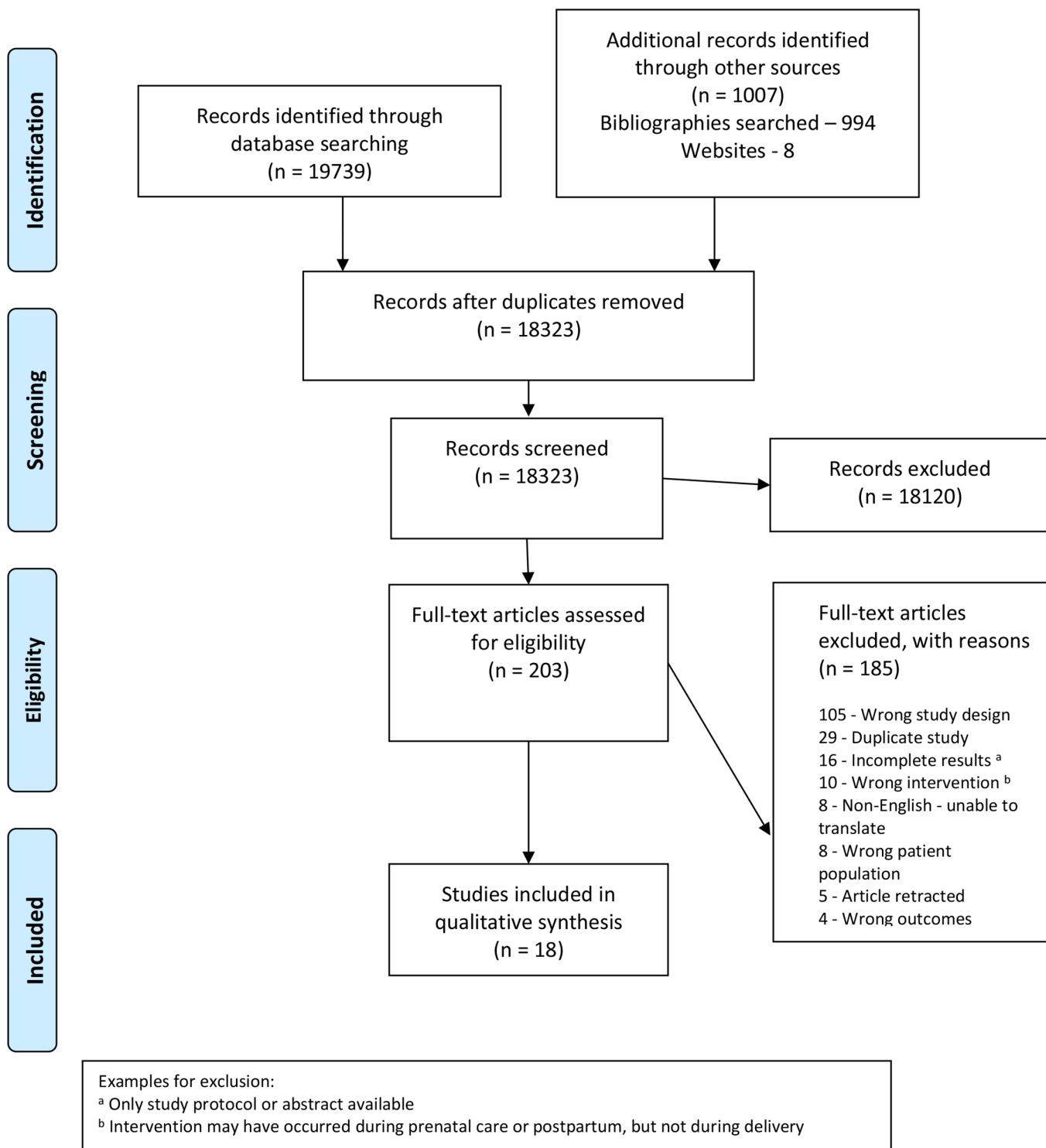


Figure 1 PRISMA flow diagram for study selection. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

prophylaxis. Regarding specific recommendations for persons with different classes of obesity, we only found recommendations for weight-based VTE prophylaxis dosing^{9 15 17} and anaesthesiology consultations.¹⁴

Regarding the practical tools for implementation (table 3), the style varied. In a checklist and bundle, there were specific recommendations including ‘40 mg of enoxaparin subcutaneously two times per day for VTE

prophylaxis after caesarean delivery’²⁰ and ‘negative pressure wound therapy...applied in operating suite at the time of incision closure and left in situ for 7 days’, respectively.²¹ Another checklist had several recommendations for intrapartum and postpartum care with check boxes (eg, IUPC use, incision type, negative pressure dressing therapy), ultimately leaving the decision to perform the intervention or not up to the individual provider.²²

Table 1 Source of recommendations, year of publication, title, evidence grading system and levels and grades for seven articles related to peripartum management of obesity

Author/source	Date	Title	Evidence grading system Examples of grade and level ranges
McAuliffe <i>et al</i> ¹⁸ International Federation of Gynecology and Obstetrics	2020	Management of prepregnancy, pregnancy, and postpartum obesity ¹⁸	GRADE ³⁶ Grade strong or weak Evidence low, moderate, high or best practice
Society for Maternal-Fetal Medicine (USA); 1/6 recommendations pertain to obesity ¹¹	2020	SMFM Consult Series #51: Thromboembolism prophylaxis for caesarean delivery ¹⁵	GRADE ³⁶ Grade strong or weak Evidence low, moderate, high or best practice
van Schalkwyk and Van Eyk Society of Obstetricians and Gynaecologists of Canada (Canada); 1/7 recommendations pertain to obesity ¹⁶	2017	Guideline No. 247-Antibiotic prophylaxis in obstetric procedures ¹⁶	Canadian Task Force on Preventive Healthcare ³⁷ Levels I-III Classifications A-I
Maxwell <i>et al</i> Society of Obstetricians and Gynaecologists of Canada (Canada) ¹⁹	2019, 2020 correction	Guideline No. 392-Pregnancy and maternal obesity Part 2: Team planning for delivery and postpartum care ¹⁹	Canadian Task Force on Preventive Healthcare ³⁷ Levels I-III Classifications A-E,I
Denison <i>et al</i> . Royal College of Obstetricians and Gynaecologists (UK) ¹⁴	2018	Care of women with obesity in pregnancy Green-top Guideline #72 ¹⁴	Clinical Governance Advice No.1 Development of RCOG Green-Top Guidelines ³⁸ Grades A-D, and 'checkmark' Levels 1++to 4
Royal College of Obstetricians and Gynaecologists (UK) ³⁸	2015	Reducing the risk of venous thromboembolism during pregnancy and the puerperium Green-top Guideline No.37a ¹⁷	Clinical Governance Advice No.1 Development of RCOG Green-Top Guidelines ³⁸ Grades A-D, and 'checkmark' Levels 1++to 4
American College of Obstetricians and Gynecologists Practice Bulletin (USA) ⁹	2015	Practice Bulletin #156 Obesity in pregnancy ⁹	US Preventive Services Task Force ³⁹ Grade A-C Levels I-III

GRADE, Grading of Recommendations Assessment, Development and Evaluation; RCOG, Royal College of Obstetricians and Gynaecologists; SMFM, Society for Maternal-Fetal Medicine.

Common terms found in the tools from Google Scholar searches included 'consider' a certain treatment option or 'anticipate' a particular complication (online supplemental appendix B). We noted differences in these tools for continuous fetal monitoring, where two tools recommend continuous fetal monitoring,^{23 24} but one did not.²⁵ In addition, two tools^{21 26} recommended negative pressure dressing therapy for certain circumstances (eg, BMI >35 kg/m² or >40 kg/m²) whereas another tool stated 'avoid the use of wound vacs.'²³

We then evaluated the similarities and differences between the evidence-rated recommendations in table 2 and any of the published tools in table 3. The evidence to support or not support the content in the tools from table 2 was provided in the last column of table 3. Some of the differences noted are as follows. The one recommendation in the checklist from the Society for Maternal-Fetal Medicine was supported from its own clinical series article.^{15 20} The recommendation from the bundle for prophylactic negative pressure wound therapy to reduce surgical site infection at a hospital in New South Wales,

Australia was not supported by any recommendations in table 2.²¹ We observed that evidence-rated recommendations supported the majority of the content in the checklist from Abdelmalek *et al*. These included to notify anaesthesiology providers, have resources available to accommodate increased weight (eg, operating room equipment and blood pressure cuffs), give prophylactic anticoagulation (though dose adjustments not specified) and have a lactation consultation.²² However, content such as delay in staple removal or adjustments in postpartum pain management were not found in other evidence-rated recommendations in table 2.

DISCUSSION

Principal findings

In our scoping review of the peripartum management of obesity, we found seven articles with evidence-rated recommendations. The articles included national guidelines from the FIGO (n=11 recommendations), USA (n=6 recommendations), UK (n=13 recommendations) and

Table 2 Topics, recommendations, and level or grade of evidence among seven articles related to peripartum management of obesity

Topic	Recommendation	Level or grade of evidence
Route of delivery	The decision for a woman with maternal obesity to give birth by planned caesarean section should involve a multidisciplinary approach, taking into consideration the individual woman's comorbidities, antenatal complications and wishes. ¹⁴	Level 2-, C
Labour induction	Induction of labour is recommended at 41+0 weeks of gestation for women with a BMI ≥ 35 owing to their increased risk of intrauterine death. ¹⁸	Strong + + +
	Elective induction of labour at term in obese women may reduce the chance of caesarean birth without increasing the risk of adverse outcomes. ¹⁴	Level 2+, B
	Where macrosomia is suspected, induction of labour may be considered. Parents should have a discussion about the options of induction of labour and expectant management. ¹⁴	Level 1+, B
Fetal monitoring	Electronic fetal monitoring is recommended for women in active labour with a BMI ≥ 35 . Intrauterine pressure catheters and fetal scalp electrodes may help. ¹⁸	Conditional +
	1. Electronic fetal monitoring can be considered for women in active labour with a BMI >35 kg/m ² .	III-B
	2. Intrauterine pressure catheters may assist in assessment of labour contractions.	
	3. Fetal scalp electrodes may be helpful to ensure continuous fetal monitoring when indicated. ¹⁹	
Labour management	Allowing a longer first stage of labour before performing caesarean delivery for labour arrest should be considered in obese women. ⁹	B, Level II-2,3
Blood pressure monitoring	Where available, an appropriately sized blood pressure cuff should be used for measurements. The cuff size used at the earliest time point should be documented in the medical records. ¹⁸	Conditional ++
Intravenous access	Establish venous access in early labour for women with a BMI ≥ 40 and consider a second cannula. ¹⁸	Conditional +
	Women with a BMI 40 kg/m ² or greater should have venous access established early in labour and consideration should be given to the siting of a second cannula. ¹⁴	Checkmark
Regional anaesthesia	In the case of vaginal delivery for women with a BMI ≥ 40 , early placement of an epidural catheter is advisable in the case of an emergency caesarean delivery. ¹⁸	Conditional + +
Antibiotic prophylaxis for caesarean delivery	Women with a BMI ≥ 30 having a caesarean delivery are at increased risk of wound infection and should receive prophylactic antibiotics at the time of surgery. Women with obesity may benefit from higher doses. ¹⁸	Strong + + + +
	In patients with morbid obesity (BMI >35), doubling the antibiotic dose may be considered. ¹⁶	III-B
	Women with obesity may benefit from higher dosage of preoperative antibiotics for caesarean birth. ¹⁹	I-A
	Women with class one obesity or greater having a caesarean section are at increased risk of wound infection and should receive prophylactic antibiotics at the time of surgery. ¹⁴	Level 1++ , A
Incision type, skin closure for caesarean delivery	There is a paucity of high-quality evidence to support the use of one surgical approach over another. Surgical approaches should therefore follow NICE CG132 but clinicians may decide alternative approaches are merited depending on individual circumstances. ¹⁴	Checkmark
Subcutaneous tissue closure	It is recommended to reapproximate the subcutaneous tissue layers at the time of caesarean birth to reduce wound complications. ¹⁹	II-2A
	Women undergoing caesarean section who have more than 2 cm subcutaneous fat should have suturing of the subcutaneous tissue space in order to reduce the risk of wound infection and wound separation. ¹⁴	Level 1++ , A

Continued

Table 2 Continued

Topic	Recommendation	Level or grade of evidence
	Subcutaneous drains increase the risk of postpartum caesarean wound complications and should not be used routinely. ⁹	Grade A, Level 1
	There is a lack of good-quality evidence to recommend the routine use of negative pressure dressing therapy, barrier retractors and insertion of subcutaneous drains to reduce the risk of wound infection in obese women requiring caesarean sections. ¹⁴	Level 2- to 1+, B
Haemorrhage	Active management of the third stage should be recommended to reduce the risk of postpartum haemorrhage. ¹⁸	Strong + + +
	Although active management of the third stage of labour is advised for all women, the increased risk of PPH in those with a BMI greater than 30 kg/m ² makes this even more important. ¹⁴	Level 2+++, A or Level 1++, B*
VTE prophylaxis	Postoperative pharmacologic thromboprophylaxis should be prescribed based on maternal weight. ¹⁸	Conditional + +
	Mechanical thromboprophylaxis is recommended before and after caesarean delivery. Where available, women with a BMI ≥ 35 should be given graduated compression stockings, or other interventions such as sequential compression devices, after caesarean delivery until mobilisation, which should be encouraged early. ¹⁸	Conditional + +
	When pharmacologic thromboprophylaxis is needed in pregnant women with class III obesity, we suggest the use of intermediate doses of enoxaparin (for caesarean delivery). ¹⁵	2C
	Postoperative thromboprophylaxis is recommended, at appropriate dosing for the given BMI, due to the greater risk of VTE following caesarean birth with women with obesity. ¹⁹	II-3 A
	All women with class three obesity (BMI greater than or equal to 40 kg/m ²) should be considered for prophylactic LMWH in doses appropriate for their weight for 10 days after delivery. ¹⁷	D
	Women with two or more persisting risk factors listed in table 1 should be considered for LMWH in prophylactic doses appropriate for their weight for 10 days after delivery. One risk factor=BMI ≥ 30 kg/m ² . ¹⁷	B
	Mechanical thromboprophylaxis is recommended before caesarean delivery, if possible, as well as after caesarean delivery. ⁹	B, Level II-3
	Weight-based dosage for VTE thromboprophylaxis may be more effective than BMI-stratified dosage strategies in class III obese women after caesarean delivery. ⁹	B, Level II-3
Breast feeding	Obesity is associated with low breastfeeding initiation and maintenance. Women with obesity in early pregnancy should receive specialist advice on the benefits of breastfeeding and appropriate antenatal and postnatal support for breastfeeding initiation and maintenance. ¹⁸	Conditional + +
	Women with obesity should be offered lactation support in the postpartum period. ¹⁹	III C
	Obesity is associated with low breastfeeding initiation and maintenance rates. Women with a booking BMI 30 kg/m ² or greater should receive appropriate specialist advice and support antenatally and postnatally regarding the benefits, initiation and maintenance of breastfeeding. ¹⁴	Checkmark, Level 1+
Anaesthesiology consult	Antenatal assessment with obstetric anaesthesia may assist in planning for safer birth for women with obesity. ¹⁹	III-A
	The on-duty anaesthetist covering the labour ward should be informed of all women with class III obesity admitted to the labour ward for birth. This communication should be documented by the attending midwife in the notes. ¹⁴	Checkmark
	Consultation with anaesthesia service should be considered for obese pregnant women with OSA because they are at an increased risk of hypoxaemia, hypercapnia and sudden death. ⁹	C

Continued

Table 2 Continued

Topic	Recommendation	Level or grade of evidence
Systems	Where possible, healthcare facilities should have clearly defined pathways for the management of pregnant women with obesity. The adequacy of resources and equipment available should be considered when making decisions around care, especially for women with a BMI ≥ 40 . ¹⁸	Conditional +
	Obstetric team planning may be helpful for women with obesity to navigate the steps in antenatal, labour and delivery, and postnatal care. ¹⁹	III-3 A†

*The recommendation is reported as 'level 2++', 'A' on page 26 of the document and also reported as 'level 1++', 'B' on pages 8 and 30 of the document.
†The recommendation is reported as 'III-3 A', though this level and grade of evidence is not defined in the Society of Obstetricians and Gynaecologists of Canada document.
BMI, body mass index; LMWH, low-molecular-weight heparin; NICE CG, National Institute for Health and Care Excellence Clinical Guidelines; OSA, obstructive sleep apnoea; PPH, postpartum haemorrhage; VTE, venous thromboembolism.

Canada (n=9 recommendations). The majority of the levels of evidence were second or third tier (Level 2 from Grades of Recommendations, Assessment, Development and Evaluation, Level II or III from Canadian Task Force on Preventive Health Care, or Grade B or C from US Preventive Services Task Force). The recommendation that was of the highest grade (strong, level 1 or grade A) was antibiotic prophylaxis for caesarean delivery,^{14 18} yet these recommendations apply to persons of all weights. A higher dosage of preoperative antibiotics for caesarean delivery also had the highest grade in one article¹⁹ as well as subcutaneous tissue closure.^{9 14} We noted that 13 recommendations were based on expert opinion, or the lowest level of evidence. We noted that the majority of these recommendations would be considered 'low-risk' interventions such as lactation and anaesthesia consults and developing a system or clinical care pathway for persons with obesity. Other expert opinion recommendations might be considered in the labour management for all persons depending on the clinical situation (eg, intravenous access, fetal heart rate monitoring and IUPC use).

Although we did not find directly opposing recommendations, there were subtle differences in some of the recommendations including criteria for anaesthesia consults and antibiotic dosing. There is considerable debate over appropriate prophylactic dosing of antibiotics for caesarean delivery in persons with obesity given that pharmacokinetic studies suggest improved or similar tissue concentrations with adjusted dosing,²⁷⁻³⁰ whereas a study comparing clinical outcomes such as surgical site infections did not demonstrate significant differences when comparing standard versus higher doses of antibiotics.³¹ The variations in recommendations may reflect the uncertainty of whether to reach a physiological target versus a clinical outcome.

We found that the recommendation for prophylactic negative pressure therapy in one tool contradicted the RCOGs' recommendation regarding this practice ('There is a lack of good-quality evidence to recommend the routine use of negative pressure dressing therapy...').¹⁴ We acknowledge the content in the tools may be unique to a site depending on available resources at the time of peripartum care as well as historical practice patterns, cost, ease of use and risk/benefit ratio to maternal and fetal health. In the tools we reviewed, language such as 'consider' or 'anticipate' suggests that a concrete recommendation is not available and care needs to be individualised.

Strengths and limitations in relation to other studies

Other authors have published summaries of clinical guidelines, similar to the ones we identified. For example, a systematic review of guidelines available worldwide for the management of obesity in pregnancy found 32 clinical practice guidelines covering the domains of preconception care, care during pregnancy, diet and exercise during pregnancy, care immediately before, during and after delivery, and postpartum care.³² For delivery and

Table 3 Title, year of publication, source of recommendations, content topic and evidence to support recommendations among three tools related to the peripartum management of obesity

Title	Year	Source or site	Tool type	Content	Evidence to support content when a definitive recommendation was made in the tool
Society for Maternal-Fetal Medicine Special Statement: Checklist for thromboembolism prophylaxis after caesarean delivery ²⁰	2020	Society for Maternal-Fetal Medicine	Checklist	VTE prophylaxis (after caesarean delivery) For women with BMI 40 kg/m ² or greater (class three obesity) who have thrombophilia or history of deep venous thrombosis or pulmonary embolism, intermediate-dose low-molecular-weight heparin (eg, enoxaparin 40 mg SC every 12 hours); continue for 6 weeks postoperatively	SMFM ¹⁵ level 2C
Reducing surgical site infections post-caesarean section in an Australian hospital, using a bundled care approach ²¹	2020	NSW Local Health District, Australia	Bundle	Subcutaneous tissue closure Negative pressure wound therapy BMI >35 (PICO*) BMI >40 (Prevena) applied in operating suite at the time of incision closure and left in-situ for 7 days	RCOG ¹⁴ level 2- to 1+, B does NOT support recommendation

Continued

Table 3 Continued

Title	Year	Source or site	Tool type	Content	Evidence to support content when a definitive recommendation was made in the tool
Team Planning in Obstetrical Care for Women with Obesity ²²	2019	Mount Sinai Hospital in Toronto, Ontario Canada	Checklist	<p><i>General admission for delivery</i></p> <p>PICC line recommended (checkbox)</p> <p><i>Intrapartum</i></p> <p>Type of delivery (spontaneous or induced labour or Caesarean delivery) (checkbox)</p> <p>Appropriate size (blood pressure) cuff</p> <p>Appropriate size gown, long monitoring belts</p> <p>Notify OB, Anaesthesia, Respiratory therapist, Neonatology</p> <p>May need cross and type</p> <p>IUPC use (checkbox)</p> <p>Encourage ambulation</p> <p><i>Caesarean delivery</i></p> <p>Incision location</p> <p>Method of (incision) closure</p> <p>Use of negative pressure wound system (checkbox).</p> <p>Plan for prolonged length of stay if OSA/CPAP (checkbox)</p> <p>Additional medication for gastric emptying/GERD and possible additional antibiotics</p> <p>Equipment (OR table with side bars and pads, OR tray, hover mat, epidural/spinal needle and portable ultrasound, Troop pillow, need for difficult airway try, Mobius retractor and Sturgeon, Traxi Panniculus retractor, negative pressure wound system)</p> <p>Need for increased length of stay due to anaesthesia (checkbox) (eg, CPAP for sleep apnoea).</p> <p><i>Postpartum</i></p> <p>Bariatric bed required for a weight >500 lbs. (checkbox)</p> <p>Delay in suture or staple removal with the postoperative day entered for removal as an outpatient.</p> <p>Prophylactic anticoagulation, early ambulation encouraged</p> <p>Pain management plan with dosage changes</p> <p>Breastfeeding, lactation consultant</p> <p>Dietician follow-up</p>	<p>FIGO¹⁸</p> <p>Conditional++ for BP cuff size</p> <p>RCOG¹⁴ 'Checkmark' for notify anaesthesia</p> <p>SOGC^{16,19} level 1 A and level III-B for additional antibiotics</p> <p>FIGO¹⁸ Conditional + for resources and equipment</p> <p>SMFM¹⁵ Level 2C, FIGO Conditional ++, SOGC¹⁹ II-3 A, RCOG¹⁴ Grade B or D, ACOG⁹ Grade B level II-3 for prophylactic anticoagulation</p> <p>None for delayed staple removal or pain management changes</p> <p>FIGO¹⁸ conditional ++, RCOG¹⁴ 'checkmark', level 1+ for breastfeeding</p>

*PICO is a type of single use negative pressure wound therapy system. ACOG, American College of Obstetricians and Gynecologists; BMI, body mass index; BP, blood pressure; CPAP, continuous positive airway pressure; FIGO, International Federation of Gynecology and Obstetrics; GERD, gastroesophageal reflux disease; IUPC, intrauterine pressure catheter; NSW, North South Wales; OB, obstetrics; OR, operating room; OSA, obstructive sleep apnoea; PICC, peripherally inserted central catheter; RCOG, Royal College of Obstetricians and Gynecologists; SC, subcutaneous; SMFM, Society for Maternal-Fetal Medicine; SOGC, Society of Obstetricians and Gynaecologists of Canada; VTE, venous thromboembolism.

postpartum care, those authors identified the following recommendations: (1) obesity alone not an indication for induction of labour, (2) early establishment of venous access during labour for women with a BMI >40 kg/m², (3) allowing for a longer first stage of labour before performing a caesarean delivery for labour arrest and (4) active management of the third stage of labour. Recommendations pertaining to caesarean delivery included: (1) obesity alone not an indication for elective caesarean delivery, (2) need for adequate staffing and equipment for maternal weight >120 kg, (3) suturing subcutaneous tissue if >2 cm of depth, (4) use of mechanical thromboprophylaxis before and after caesarean delivery and (5) weight-based dosing of medication used to prevent VTE. Lastly, they also identified recommendations for breastfeeding support and lactation consultants. These recommendations were similar to the ones we identified from national guidelines in our scoping review.^{9 14 19}

Several of the evidence-rated recommendations in [table 2](#) supported the content in the 11 tools we identified. However, we also found content not supported by evidence-rated recommendations such as a peripherally inserted catheter for difficult intravenous access and delayed staple removal. We identified a randomised controlled non-inferiority trial of early (postoperative day 3) or delayed (between postoperative days 7 and 10) staple removal for transverse skin incisions in persons with a BMI ≥30 kg/m².³³ Although the study was stopped prior to reaching the targeted sample size, the occurrence of superficial wound dehiscence was 15.2% in the early and 11.5% in the delayed group (Relative Risk 1.3, 95% CI 0.7 to 2.4) and there were no other differences in the secondary outcomes of seroma, haematoma, surgical site infection or pain scores among the two groups. Since the available evidence regarding timing of staple removal is limited, other clinical and non-clinical characteristics such as provider and patient preference likely contribute to decisions about staple removal timing.

Strengths and limitations of this study

We acknowledge several limitations to our study. We may not have identified all articles with evidence-rated recommendations, especially since our search ended in December 2020 and more recent articles were not identified. However, our search of available published literature was thorough including a search of appropriate web sites. Sites may have practical implementation tools that they use in the short term or long term, but they may not be published or available in a more public domain. We identified clinical guidelines from other countries including Ireland and Australia,^{34 35} but they were not included in this review because they were not accompanied by evidence-rated recommendations. Although topics such as contraception and postpartum weight management are important in the postpartum care of persons with obesity, they were not specifically addressed in this review, which pertained to peripartum care in the immediate postpartum period. Obesity was typically defined

Table 4 Proposed key content for a peripartum checklist or toolkit for persons with obesity

Content	Examples
Provider discussion on labour induction, delivery route and labour management	Allow for longer labour Difficulties in fetal heart rate monitoring
Expert consultations	Anaesthesiologists Lactation consultants
Prophylaxis for caesarean delivery	Mechanical devices for VTE prophylaxis Higher dose of antibiotic before delivery depending on BMI Higher dose of anticoagulant after delivery depending on BMI
Wound management	Close subcutaneous tissue without drains or wound therapy

BMI, body mass index; VTE, venous thromboembolism.

according to a BMI ≥30.0 kg/m², but in many instances the timing of the BMI was not provided (eg, prepregnancy vs at delivery). Some recommendations were specific to a particular BMI cut-off, but others pertained to obesity, in general, without specifying a BMI. Lastly, we did not include recommendations that were intended for patient education only in this review.

Meaning of the study

Based on this scoping review, we propose the following key content for a peripartum checklist or toolkit in [table 4](#). This content is based on evidence ratings and ease of implementation. In summary, persons with obesity are at high risk for morbidity and mortality, with an abundance of risk occurring during the peripartum period. A few guidelines exist for the care of these persons and the evidence to support care is limited. Thus, there is a need for high-quality studies encompassing peripartum interventions.

Conclusion

The recommendations for peripartum care for persons with obesity are based on limited evidence and few practical tools for implementation exist. Future work should focus on developing practical tools based on high-quality studies.

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Contributors MAK designed the study protocol. LCO completed the database search of potential articles. MAK, IC, JP, AP and PT reviewed abstracts, decided on inclusion and exclusion criteria, and reviewed the full-text of included articles. All authors contributed to the synthesis of results. All authors acknowledged approval of the final version for publication. MK is the guarantor of the study.

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