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# Proposed domains for assessing postpartum recovery: a concept elicitation study

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## Abstract

**Objective—**To propose postpartum recovery domains.

**Design—**Concept elicitation study.

**Setting—**Semi-structured interviews.

**Population—**Ten writing committee members and 50 stakeholder interviews (23 postpartum women, nine general obstetricians, five maternal and fetal medicine specialists, eight nurses and five obstetric anaesthetists).

**Methods—**Alternating interviews and focus group meetings until concept saturation was achieved (no new themes discussed in three consecutive interviews). Interviews were digitally recorded and transcribed, and an iterative coding process was used to identify domains.

**Main outcome measures—**The primary outcome was to identify recovery domains. We also report key symptoms and concerns. Discussion frequency and importance scores (0–100; 0 = not important; 100 = vitally important to recovery) were used to rank domains. Discussion frequency

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Contribution to authorship

PS was involved in study conception, study design, patient recruitment, performing interviews, data analysis, data interpretation and manuscript writing. SEJ, DC, MA and BG were involved in study conception, study design, data interpretation and manuscript writing. JT was involved in patient recruitment, data interpretation and manuscript writing. YE-S and SC were involved in study design, data interpretation and manuscript writing. DL was involved in data interpretation and manuscript writing. BC was involved in study conception, study design, data analysis, data interpretation and manuscript writing.

Disclosure of interests

None declared. Completed disclosure of interests form available to view online as supporting information.

**Tweetable abstract** We propose 13 postpartum recovery domains that provide a framework to study the recovery process following childbirth.

Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

was used to rank factors helping and hindering recovery, and to determine the greatest challenges experienced postpartum.

**Results—**Thirty-four interviews and two focus group meetings were performed. The 13 postpartum recovery domains identified, (ranked highest to lowest) were: psychosocial distress, surgical/medical factors, infant feeding and breast health, psychosocial support, pain, physical function, sleep, motherhood experience, infant health, fatigue, appearance, sexual function and cognition. The most frequently discussed factors facilitating postpartum recovery were: family support, lactation/breastfeeding support and partner support. The most frequently discussed factor hindering recovery was inadequate social support. The most frequent challenges reported were: breastfeeding (week 1), breastfeeding (week 3) and sleep (week 6).

**Conclusions—**We propose 13 domains that comprehensively describe recovery in women delivering in a single centre within the USA. This provides a novel framework to study the postpartum recovery process.

### Keywords

Caesarean section; childbirth; dimenesions; domains; postpartum; recovery; vaginal delivery

## Introduction

Every year approximately 140 million women worldwide experience recovery from childbirth.[1] Birth rates within the USA are currently estimated to be approximately 3.8 million per year.[2] Despite the frequency of childbirth, postpartum recovery remains a poorly defined and inadequately explored construct. This may in part be because there is no robust tool to track the postpartum recovery experience. Although patient-reported measures of recovery during hospital stay such as the Obstetric Quality of Recovery instrument (ObsQoR-11 and ObsQoR-10) have been developed and validated in the UK and US healthcare settings,[3–7] there currently appear to be few rigorously developed or validated tools that comprehensively assess postpartum recovery after hospital discharge.[8,9]

Postpartum recovery is a complex, culturally variable and multi-dimensional construct. Therefore, the first step towards developing a new instrument for capturing relevant patient-centred aspects of longer-term postpartum recovery is to identify its most important health domains (or dimensions). We recently proposed such domains based on a comprehensive literature review of postpartum recovery studies.[8] However, these domains did not account for the views of key relevant stakeholders including postpartum women, obstetricians, maternal and fetal medicine specialists, nurses and obstetric anaesthetists.

In this study we aimed to: (1) propose a comprehensive list of outpatient postpartum recovery health domains, applicable to all delivery modes; (2) rank domains of recovery health (weighted based on frequency of discussion and perceived importance by stakeholders); (3) rank factors that improve and hinder postpartum recovery health based on frequency of discussion among stakeholders; and (4) rank the greatest challenges experienced by mothers at 1, 3 and 6 weeks postpartum based on frequency of discussion among women interviewed in the postpartum period.

## Methods

After obtaining Internal Review Board ethical approval from Stanford University (IRB number 51968; approval date 26 August 2019), we prospectively recruited key stakeholders including women who had recently given birth and healthcare professionals (obstetricians, maternal and fetal medicine specialists, labour and delivery nurses, postpartum clinic nurses and obstetric anaesthetists) with expertise in caring for women in the postpartum period. Eligible stakeholders were invited to participate in either concept elicitation interviews or focus group meetings.

Consideration for patient recruitment required the delivery of at least one live infant within the past 7 days at Lucile Packard Children's Hospital (Stanford, CA, USA). A convenience sample of women was recruited into this study based on patients who had been admitted to the postpartum ward and investigator availability. Efforts were made to recruit a diverse population by screening for women who experienced different delivery modes, maternal morbidity (including preeclampsia, post-dural puncture headache and gestational diabetes mellitus), multiple gestation and women delivering neonates requiring neonatal intensive care unit admission. Any delivery mode, gestational age or parity was considered for inclusion. We included all women, regardless of medical insurance and medical, obstetric or anaesthesia-related morbidities or complications experienced, and included women delivering neonates requiring a planned or unplanned neonatal intensive care unit stay. Women were excluded if they did not speak or understand English, had an intrauterine death or declined to participate in an interview. Upon successful completion of the interview, postpartum women received a $30 gift voucher. Women were recruited on the postpartum ward and written consent was obtained to perform a digitally recorded phone interview between 6 and 12 weeks postpartum.

Inclusion criteria for healthcare professionals recruited into this study included at least 5 years of experience in their chosen profession (obstetrician, maternal and fetal medicine, nursing or obstetric anaesthesia). We aimed to recruit obstetricians from both academic and private practices, who care for women from a variety of socio-economic and cultural backgrounds. A convenience sample of nurses based at the Stanford labour and delivery ward and obstetric postpartum follow-up clinic, were approached and recruited based on availability for interview. Healthcare professionals were excluded if they did not consent to participate in a digitally recorded face-to-face interview. Healthcare professionals were recruited via email and written consent was obtained on the day of face-to-face interview.

### Data collection

Semi-structured interviews of healthcare workers and postpartum women, based on previously published and validated approaches,[10–13] were developed in conjunction with social science experts (SJ and DC) and conducted with an expert in postpartum recovery (PS). All digitally recorded interviews were conducted either face-to-face or via telephone, and were transcribed by a professional transcription service. An outline of the semi-structured interviews conducted with healthcare professionals and postpartum women is provided in Supplementary File S1a and S1b.

Figure 1 summarises the seven phases of interviews, focus in-person group meetings and electronic group discussions (consensus obtained via email discussion) undertaken in this study. Obstetricians, nurses and postpartum women were interviewed until concept saturation (no new themes identified in three consecutive interviews) was achieved.[14] Obstetricians were interviewed first because they routinely perform postpartum clinic visits. A focus group meeting of obstetricians, maternal and fetal medicine specialists and labour and delivery nurses was then performed to determine whether additional concepts were missed from Phase 1 interviews. Obstetric postpartum follow-up clinic nurses were then interviewed until concept saturation was achieved before commencing interviews with postpartum women. Following concept saturation with postpartum women a further focus group meeting with anaesthetists was performed. Obstetric anaesthetists were interviewed in order to include clinician perspective regarding postpartum pain, frequently experienced adverse effects and anaesthesia-related complications that can persist (or present) following hospital discharge such as neuropathy and headache. Final interviews were performed with postpartum women until a total of 50 stakeholder interviews were completed.

Semi-structured interviews with all stakeholders involved answering three key questions. (1) What does recovery following childbirth mean to you? (2) What do you feel are the most important symptoms or concerns regarding recovery following childbirth? (3) What factors do you feel improve or hinder recovery following childbirth? Postpartum women were also asked to report their biggest challenges faced at 1, 3 and 6 weeks following delivery. All stakeholders were invited to score proposed recovery domains in terms of perceived importance related to quality of postpartum recovery (scored between 0 and 100; where 0 = not at all important to recovery and 100 = vitally important to recovery) and to amend or edit proposed domains of postpartum recovery health. Table S1 summarises task allocation during each phase of the study.

Recruited women had demographic, obstetric, medical comorbidity, anaesthetic complications and neonatal data recorded. Women participating in interviews were also asked questions regarding pain, timing of analgesia cessation, resumption of activities of daily living, level of social support, method of infant feeding and sleep. Healthcare professionals that participated in the study reported their specialty and years of experience.

Recovery health domains reported in a previous scoping and systematic review were used as a starting framework for the Phase 1 interviews.[8] The format of the focus group meetings included: (1) outlining a summary of domains and recovery symptoms based on findings from Phase 1 interviews (Supplementary File S1c), (2) determining any concerns identified from completed interviews up to that point; (3) facilitating subsequent discussion with the aim of encouraging stakeholders to add symptoms and concerns to existing domains related to recovery; (4) amending or editing the grouping of recovery health symptoms and concerns into domain headings and (5) scoring perceived importance of domains. The addition of symptoms/concerns/extra items to recovery domains proposed from Phase 1 interviews was encouraged using an iterative process. If a new domain was proposed by a stakeholder, then scoring would be based on ratings provided in subsequent interviews. Domains deemed to be important for inclusion (elicited through direct questioning) by more than five stakeholders were included in the final list of postpartum recovery domains. The

writing committee came to a consensus regarding the final proposed domain headings for postpartum recovery health. There was no set limit regarding the number of domains that could be considered in the final proposed list.

## Study outcomes

The primary aim of this study was to identify and propose a list of domains (and items within each domain) that comprehensively covered all aspects of outpatient postpartum recovery. Secondary aims were to report and rank domains (word cloud analysis and number of stakeholder reported items grouped into domains and weighted according to perceived importance of each domain); report and rank the frequency of factors that improve and hinder recovery; and report and rank the frequency of greatest challenges faced by mothers at 1, 3 and 6 weeks postpartum.

## Statistical analysis

An iterative coding process was applied to transcripts from all interviews and focus group meetings. This involved recording individual symptoms or concerns reported by stakeholders discussing the symptoms or concerns. Symptoms or concerns were then grouped into finalised domains.

Transcribed interviews and focus group meetings were combined in a word cloud analysis (using worditout.com), to provide an additional method of identifying domains and ranking symptoms and concerns. Frequency of recovery symptoms and concerns, factors helping and hindering recovery and the biggest maternal challenges faced at each time-point were determined through manual data extraction and transferred into an EXCEL spreadsheet (Microsoft Excel for Mac 2011, Version 14.7.7). Median (interquartile range [IQR]) scores for perceived importance of domains were calculated. Overall rankings of domains were determined by:

1. number of items per domain;
2. frequency of items discussed by stakeholders grouped into domains;
3. weighted score of domains (obtained by frequency of items discussed by stakeholders multiplied by the median score of perceived importance of each domain).

We determined the number of stakeholders needed to complete this study based on previous concept elicitation studies and the anticipated number of stakeholders that would be required to achieve concept saturation.[14,15] Saturation is reached when no new concepts emerge over three consecutive interviews within each stakeholder group. Previous studies demonstrate that saturation often occurs within the first 12 interviews and basic elements for themes are sometimes present as early as six interviews.[16] Consequently, we aimed to recruit stakeholders until saturation was achieved with the aim of recruiting up to 50 healthcare professionals (obstetricians, maternal and fetal medicine specialists, labour and delivery and postpartum clinic nurses and obstetric anaesthetists) and postpartum women in total. It was felt that this number of stakeholders would be sufficient to achieve concept saturation from each healthcare specialty and from postpartum women experiencing each mode of

delivery.[14,16] We anticipated that the dropout rate for healthcare professionals would be low (less than 10%), but would be higher (up to 50%) among postpartum women recruited in the first week following childbirth, for their subsequent interview 6 weeks later.

## Results

Stakeholders were recruited between 9 September 2019 and 2 March 2020. Interviews occurred between October 2019 and April 2020. Figure S1 summarises the numbers of stakeholders approached, recruited and interviewed during the study period. A total of 50 stakeholders participated in interviews spanning a total of 20.1 hours. The mean duration of each interview was 33.4 (SD 9.4) minutes. The combined transcription word count total from all 36 completed interviews and focus group meetings throughout the study period was 172 332 words.

The gender and type of practice of healthcare workers and demographic, peripartum and recovery factors of postpartum women interviewed are summarised in Table S2. The median interval between delivery and interview of recruited postpartum women was 50 (IQR 45–55) days ($n = 23$). In total, the proposed domains of postpartum recovery are based on input from interviews with 50 stakeholders and consensus from ten members of the writing committee.

### Proposed recovery domains

The seven phases of this project resulted in several amendments and suggested changes to proposed domain headings, which are summarised in Table 1. All of the included recovery domains were discussed and deemed important for inclusion in more than five stakeholder interviews. The domain of ‘spirituality’ was proposed by a postpartum woman during Phase 6 interviews as an important element of recovery, but was only deemed important to two stakeholders and not important to four postpartum women. This domain was therefore not included in the final list of domains.

### Most important recovery symptoms and concerns

Table 2 provides a comprehensive list of symptoms and concerns that were deemed to be important to stakeholders interviewed in this study (162 symptoms identified from stakeholder interviews and 102 symptoms identified in a previously published scoping review;[8] 264 in total). A postpartum recovery word cloud formulated from all transcribed interviews and focus group meetings is provided in Figure 2. No additional domains were identifiable using word frequency analysis.

### Ranking of domains

The perceived importance (0–100) of individual domains, frequency of discussion during stakeholder interviews and weighted scores are provided in Table 3.

### Factors helping and hindering recovery

The top 20 ranking factors identified by stakeholders as helping postpartum recovery are summarised in Table 4. Tables S3a and S3b provide a summary of factors reported by

two or more stakeholders and one stakeholder, respectively. The five most commonly reported factors helping recovery in order of frequency were: family support, lactation/breastfeeding support, partner support, walking/exercise/getting outside and social/friend support. The number of factors that were described by stakeholders as helping recovery, grouped according to domains in order of frequency were: psychological distress (nine); psychosocial support (nine); surgical and medical factors (eight); feeding/breastfeeding/breast health (six); physical function (six); sleep (five); pain (three); fatigue (one) and motherhood experience (one).

Factors reported to hinder recovery are summarised in Table S4. All factors reported by more than one stakeholder were from the domains of psychosocial support and psychosocial distress.

### Greatest challenges faced at 1, 3 and 6 weeks postpartum

The most frequently reported greatest challenges faced by mothers at 1, 3 and 6 weeks postpartum are summarised in Table S5. Breastfeeding was the most frequently reported challenge faced by women at 1 and 3 weeks postpartum. Sleep in addition to adapting to maternal role (time management, establishing a routine, gaining independence and caring for other children) were the highest ranking challenges faced at 6 weeks postpartum.

## Discussion

Our study frames the construct of postpartum recovery health along 13 domains. These domains are weighted on their relative importance based on stakeholder input and frequency of discussion. We also provide a comprehensive list of factors that can hinder or facilitate recovery. These results provide a novel framework to comprehensively study the postpartum recovery process and can be used to derive meaningful recovery end points. These findings may be used to inform the direction of future research by helping to identify or formulate suitable outcome measures that can be used to assess and characterise normal and impaired recovery profiles.

Patient-reported outcome measures are often used to assess recovery following non-obstetric surgery.[17] Across 515 publications, 201 patient-reported outcome measures have been used to assess postpartum recovery;[8] however, few have been robustly developed or adequately validated. Optimum patient-reported outcome measures for two domains identified in this study (postpartum sleep and pain) have recently been identified.[18,19] Three outpatient postpartum recovery patient-reported outcome measures have also recently been identified as having adequate content validity (assessment of at least nine of the 13 domains) based on domains proposed in this study.[9] These measures include Postpartum Quality of Life, Maternal Concerns and WHOQoL-BREF.[20–22] However, all these existing measures have significant limitations, and the need to develop and validate a new postpartum recovery measure has recently been highlighted.[9,23] Findings from this study can be used to help develop such a measure using PROMIS® -endorsed methodology.[24]

Previous literature based on author-defined recovery domains was used as a starting point for developing the more definitive list of domain headings proposed in this study.[8] Reassuringly,

domains identified from interviews in this study are consistent with those identified in the previously published review, with the addition of only one extra domain (infant health). The inclusion of an additional 162 symptoms or concerns, not previously identified through literature review alone further justifies the need for this study. Furthermore, analysis of interviews also resulted in the renaming of three domains (‘surgical and medical factors’, ‘infant feeding/breastfeeding/breast health’ and ‘appearance/cosmetic factors’). The current study also provides important stakeholder input and a contemporary and robust evaluation of the postpartum period of recovery, in addition to providing insight into the perceived importance of the individual recovery domains identified.

The majority of domains (eight out of 13; 62%) had median importance scores greater than 90 out of 100. Cognition, sexual function, appearance/cosmetic factors and fatigue domains were consistently among the lowest ranked domains, whereas psychosocial distress, surgical and medical factors, infant feeding/breastfeeding/breast health and psychosocial support were consistently ranked highly. Sexual function was a low-ranking domain in this study, which is probably attributable to the timing of the postpartum interviews (median interview time of 50 days postpartum), as most of the women interviewed had not yet engaged in sexual intercourse. The perceived importance of this and other domains is expected to change temporally in the postpartum period. Determining how much each individual domain contributes to overall postpartum recovery is challenging because domains are likely to be not discrete or mutually exclusive. Recovery is multifactorial, with domain weighting for each individual patient dependent on pre-existing social circumstances, mental health and medical and physical status, in addition to unique challenges encountered following delivery. Future studies are needed to determine how individual domains impact each other and contribute to overall recovery experience in different social, medical and cultural circumstances.

This study has several limitations. We made efforts to interview a diverse cohort of obstetricians and maternal and fetal medicine specialists from academic and private practices; however, all included study participants (including postpartum women) were from a similar geographical location within the USA and were English-speaking. The 57% completion rate of postpartum women recruited into the study may have resulted in selection bias of women experiencing ‘better’ recoveries. However, we feel that this is unlikely because interviews were carried out with women who had subjectively and objectively experienced ‘good’ and ‘poor’ recoveries. We recruited a heterogeneous population of women in terms of race/ethnicity (Hispanic, Asian and Caucasian) with a variety of factors that were associated with worse recovery including: obstetric factors (twin pregnancy), neonatal factors (neonatal requirement for neonatal intensive care unit admission), postpartum complications (postpartum depression, requirement for epidural blood patch and hospital re-admission) and social factors (non-insured women). We acknowledge that none of the women interviewed were African American and we also did not interview co-parents, who may have added alternative perspectives and insight into postpartum recovery. We also accept that interviewing women between 6 and 12 weeks following delivery (although most women were interviewed during weeks 7 and 8 postpartum) may have resulted in recall bias related to perception of events that had transpired weeks previously. This pragmatic approach was adopted to maximise flexibility

for interview timing for women, to help achieve the highest levels of study participation and retention. Additionally, new domains added during later phases were scored by fewer stakeholders. We do, however, feel that the primary aim of this study was achieved, which was to propose maternal postpartum recovery domains through reaching our end point of concept saturation (no new themes identified in three consecutive patient interviews[14]), from women delivering via all delivery modes. We accounted for numbers of stakeholders reporting individual items, but we did not take the frequency of individual items mentioned per interview into account when ranking the domains (for example, if sleep was mentioned 15 times versus once in a single interview, it was counted as one stakeholder discussion). We felt that this was appropriate because the perceived importance score (from 0 to 100) was included in the weighted ranking of domains and we wanted each interview to contribute equally towards reported rankings. Additionally, the word cloud analysis was able to address this limitation and identify the most frequently spoken words by stakeholders.

In summary, we propose a comprehensive list of key domains that constitute the construct of postpartum recovery for women delivering in a single centre within the USA. This conceptual framework is an important step towards developing a novel postpartum recovery assessment tool. Future studies are needed to determine how generalisable our proposed recovery domains are, and determine the applicability of these domains in capturing the postpartum recovery experience within alternative racial, ethnic and socio-economic groups, in addition to mothers who develop obstetric, medical and psychiatric morbidity. These findings may also be used to identify and characterise normal and impaired recovery profiles, with the aim of intervening when delayed or impaired postpartum recovery is recognised.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Data availability

Data available on request from the authors

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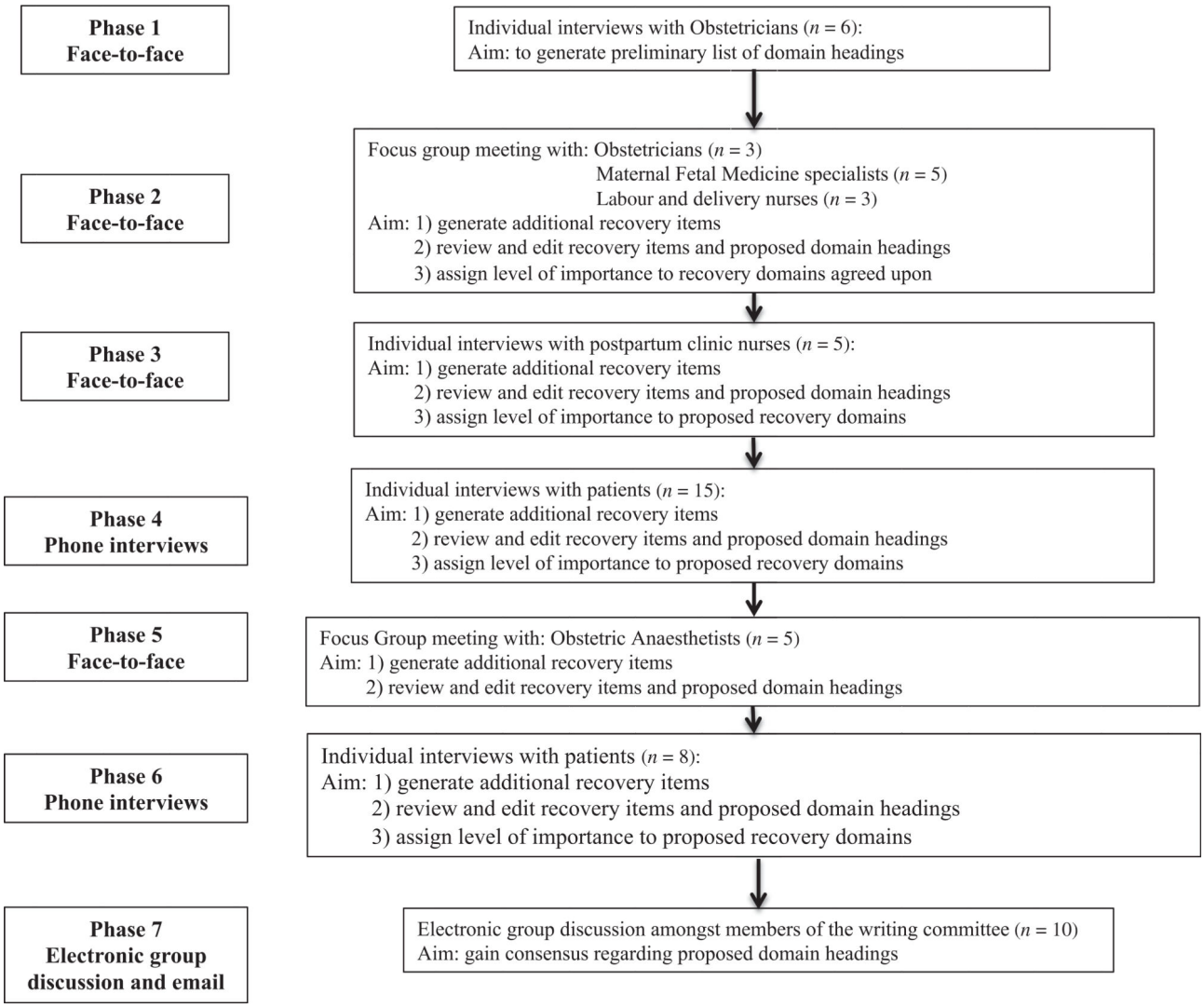


**Figure 1.**

Phases of study data collection. Stakeholders included 50 people interviewed and ten members of the writing committee (patients ($n$ = 23); obstetricians ($n$ = 10); nurses ($n$ = 8); of which three were based on labour and delivery and five were based in the postpartum follow-up clinic); obstetric anaesthetists ($n$ = 8; two participated in Phase 5 and were also members of the writing committee); maternal fetal medicine specialists ($n$ = 6); medical social science ($n$ = 2); perioperative & recovery experts ($n$ = 2); epidemiology ($n$ = 1).


**Figure 2.**

Word cloud of most frequently used words from all transcribed interviews and focus group meetings regarding postpartum recovery. Size of word correlates with frequency of use. The 25 most frequently spoken words with a frequency >100 were as follows: baby (715), recovery (679; not included in word cloud), pain (642), sleep (445), delivery (412), women (303), breastfeeding (284), physical (257), help (250), hospital (237), symptoms (233), experience (193), caesarean section (c-section; 181), mood (160), vaginal (152), postpartum (149), work (142), feeling (141), childbirth (136), depression (131), mom (125), husband (119), family (107), anxiety (106), milk (103).

**Table 1.**

Modification of recovery domain headings during each study phase and formulation of final recovery domains

| **Recovery domain headings as defined in Scoping review by Sultan et al.** | **Recovery domain headings modified during each phase of present study** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Phase 1 Obstetric** | **Phase 2 Focus (1)** | **Phase 3 Nurses** | **Phase 4 Patients** | **Phase 5 Focus (2)** | **Phase 6 Patients** | **Phase 7 Final recovery domains** |
| Physical function | | | | | (Physical health)<br>(Functional health) | | Physical function |
| Surgical complications *<br>Subgroups: Urinary/ Gynaecology/Colorectal | (Surgical factors) | (Pelvic floor complications) | | | (Surgical and medical related complications (urology/ gynaecology/colorectal/ obstetric/anaesthetic/ medical)) | | Surgical and medical factors **<br>(obstetrics/gynaecology/urology/ colorectal/anaesthetic/medical) |
| Pain | | | | | | | Pain |
| Psychosocial distress *<br>Subgroups: Anxiety/Depression/ Psychological other) | | (Add PTSD as subgroup) | | | Psychosocial distress (combined with no subgroups) | | Psychosocial distress *<br>Subgroups: Anxiety/Depression/ Psychological other |
| Psychosocial support | | | | | | | Psychosocial support |
| Sleep | | | | | | | Sleep |
| Fatigue | | | | | | | Fatigue |
| Motherhood experience *<br>(Adapting to maternal role/ maternal–neonatal bonding) | | | | | | | Motherhood experience *<br>Subgroups: Adapting to maternal role/maternal–neonatal bonding) |
| | | | | Baby health | Baby health | | Infant health **** |
| Breastfeeding/breast health | Feeding/ breastfeeding/breast health | | | | | | Feeding/Breastfeeding ***<br>Breast health |
| Sexual function | | | | | | | Sexual function |
| Scar and wound healing | (Cosmetic) | | | | | | Appearance/cosmetic *** |
| Cognition | | | | | | | Cognition |
| | | | | | | Spirituality | |

Abbreviation: PTSD, post-traumatic stress disorder.

Blank cells represent no change made during that phase of the study. Items in parentheses were suggested domain headings made by stakeholders during individual development phase, but not incorporated into the final list because of disagreement among subsequent stakeholders in future phases.

*Domains with subgroups.

** Subgroups removed as it was felt that post-delivery complications can span out with specialties of urology, colorectal and gynaecology.

*** Change in domain title compared with author-defined domain titles in scoping review following author consensus.

**** New domain not identified in previous review by Sultan et al. 'Infant health' preferred to 'baby health' by writing committee as it was felt to be more consistent with medical literature and terminology.

**Table 2.**

Symptoms and concerns associated with postpartum recovery grouped into domains

| Recovery domain* | Symptoms/items/concerns contributing to recovery domain |
|---|---|
| Psychological distress (50 in total):<br>(a) Depression (1)<br>(b) Anxiety (1)<br>(c) Psychological other (48) | Previously identified: depression<br>Previously identified: anxiety<br>Previously defined: baby blues, general health perception, emotional role, emotional adaptation, negative emotional experience, mood, enjoyment of life, fulfilment, mental health disorder, motivation, guilt/worthlessness, helpless/hopelessness, wellbeing, psychomotor retardation, in control, angry, confused, appetite, reduced activity (psychological), stress, life satisfaction, coping behaviour, embarrassment, feeling alone<br>Obstetrician: motivation, mourning for delivery mode not achieved, overwhelmed, detached, grief, frustration, fear of becoming pregnant again, tearful, disappointment<br>Nurse: PTSD (repeated), loss of self-identity<br>Patient: patience, meeting expectations, feeling of inadequacy, anhedonia, tearful, mental change, impact of COVID-19 pandemic on mood<br>Focus 2: suicidal, thoughts about feticide, pain catastrophising, feeling judged |
| Psychosocial support (43) | Previously identified: lifestyle, participation in community activities, social role, interaction with others, social relationships, social function, support from family/staff/friends, psychological support, home/environment adaptation/maintenance of personal dignity,<br>Obstetrician: social isolation, no fixed abode, single mother/donor egg (no spouse), advanced maternal age, access to obstetrician, distance to hospital<br>Focus 1: transition to returning to work<br>Nurse: childcare/nanny issues, change in relationship dynamic with spouse/partner, level of community support<br>Patient: duration of paternity leave, temperament of partner, division of chores, help with overnight childcare chores, change in family dynamic, less personal space, hosting family, connection with partner, older sibling response to new baby, impact of shelter in place due to COVID-19 pandemic, cultural variability, language spoken, spirituality e.g. praying<br>Focus 2: low financial resources, loss of privacy, competition among mothers, domestic violence |
| Surgical and medical factors (urology/obstetric/gynaecology/colorectal/anaesthesia/medical) (40) | Previously identified: urology (urinary symptoms, incontinence, micturition); gynaecology (dysmenorrhoea, uterine prolapse); colorectal (faecal symptoms, incontinence, haemorrhoids, anal fissure, nausea and vomiting)<br>Obstetrician: obstetric/gynaecology (multiple gestation, PV bleeding, lochia, vaginal laceration, incision, cutaneous paraesthesia/pruritus/oedema, SSI, reduced perineal sensation, retained products of conception, uterine sub-involution, hypertension and pre-eclampsia management, amenorrhoea, parity, unplanned delivery mode); colorectal (constipation); medical (infection, fever); medical (carpal tunnel syndrome, thromboembolism, anaemia)<br>Nurse: urology (cystocele); colorectal (rectocele)<br>Patient: medical (night sweats, oedema, cardiomyopathy)<br>Focus 2: anaesthesia (postdural puncture headache, paraesthesia) |
| Infant health (21) | Obstetrician: fetal scalp lacerations, unexpected morbidity, cardiac morbidity, neonatal demise Patient: concern about infant health, concern about infant weight, assistance with nutrition, need for light therapy/antibiotics/CPAP/ECMO, requirement for NICU, prolonged NICU, requirement for repeat hospitalisation, requirement for investigations, prematurity, checking repeatedly for breathing, tongue tie, reflux, wind, type of baby (e.g. contented, cries excessively) |
| Pain (18) | Previously identified: incision/wound; body; muscle, back pain/backache, headache, sensory/affective, pelvic<br>Obstetrician: vaginal, breast, hip, abdominal<br>Patient: requirement for opioids, neck pain/tightness<br>Focus 2: neuropathic pain |
| Sleep (18) | Previously identified: sleep quality, latency, sleep quantity, insomnia (middle, terminal), medication requirement, daytime somnolence, sleep disturbance, reduced energy due to lack of sleep, nightmares<br>Obstetrician: number of wake ups per night, influence of sleep on mood, difficulty getting back to sleep after being awoken<br>Patient: sleep quality before pregnancy, vivid dreams about baby, sleep deprivation, unpredictable sleep pattern |
| Appearance/cosmetic (16) | Previously identified: physical appearance, wound (scar appearance, healing, dehiscence)<br>Obstetrician: desire to return to pre-pregnancy weight, wound (stitches, granulation tissue, discharge, inflammation)<br>Nurse: wound healing<br>Focus 1: body dysmorphia |

| Recovery domain* | Symptoms/items/concerns contributing to recovery domain |
|---|---|
| | Patient: stretch marks, dissatisfaction with appearance<br>Focus 2: hair loss, grooming |
| Infant feeding/Breastfeeding Breast health (14) | Previously identified: breastfeeding, lactation, breast health (mastitis)<br>Obstetrician: breastfeeding (latch, milk supply, engorgement, comfort with pumping), confidence in feeding (breast/bottle) breast health (cracked nipples, bleeding nipples)<br>Patient: supplementation of breast milk with bottle, perceived success of feeding, time till expression of milk |
| Physical function (12) | Previously identified: limited function due to musculoskeletal pathology, cardiovascular deconditioning, ability to perform ADLs, physical independence<br>Obstetrician: ability to hold baby, ability to drive, ability to perform heavy lifting, ability to mobilise, ability to sit<br>Nurse: abdominal core strength<br>Patient: intake of adequate nutrition<br>Focus 2: ability to exercise |
| Sexual function (12) | Previously identified: behavioural emotive, arousal, physical, partner-related, desire, lubrication, orgasm, dyspareunia, sex satisfaction<br>Obstetrician: contraception, sexual health<br>Focus 2: return of sexuality |
| Motherhood experience (8 in total):<br>(a) Adapting to maternal role (6)<br>(b) Maternal–neonatal bonding (2) | Previously identified: caring for baby, parenting<br>Obstetrician: adapting to new role, looking after and interacting with other siblings<br>Focus 1: caregiving responsibilities<br>Patient: time management<br>Previously defined: bonding, attachment |
| Fatigue (6) | Previously identified: mental fatigue, physical fatigue<br>Obstetrician: exhaustion, feeling rested<br>Nurse: tiredness<br>Patient: energy levels |
| Cognition (6) | Previously identified: memory, critical thinking, problem solving<br>Patient: forgetfulness<br>Focus 2: decision-making capacity, executive function |

Abbreviations: ADLs, activities of daily living; COVID-19, coronavirus disease 2019; CPAP, continuous positive airway pressure; ECMO, extracorporeal membrane oxygenation; NICU, neonatal intensive care unit; PTSD, post-traumatic stress disorder; PV, per vagina; SSI, surgical site infection.

*Domains are listed in order of the number of individual symptoms/concerns/items within each domain identified from review and interviews (highest to lowest); Items presented above as 'previously identified' have been proposed in a published scoping review by Sultan et al.[8]; A total of 264 symptoms/concerns/items were identified by stakeholders that were deemed to influence outpatient postpartum recovery.

**Table 3.**

Ranking of domains according to perceived importance to stakeholders and number of stakeholders reporting items within individual domains

| Ranking | Median perceived importance score of domains[a] (IQR) (*n* = 34; scored using NRS between 0 and 100[b]) | | Total number of stakeholders reporting individual domain symptoms/concerns/ items[d] | Weighted ranking[e] |
|---|---|---|---|---|
| 1 (highest ranked) | Infant health[c] | 100 (90–100) | Psychosocial distress (97) | Psychosocial distress (9021) |
| 2 | Physical function | 98 (90–100) | Surgical/medical factors (53) | Surgical/medical factors (5194) |
| 3 | Surgical/Medical factors | 98 (80–100) | Infant feeding (50) | Infant feeding (4500) |
| 4 | Psychosocial distress | 93 (90–100) | Psychosocial support (38) | Psychosocial support (3420) |
| 5 | Pain | 90 (80–100) | Pain (37) | Pain (3330) |
| 6 | Motherhood experience | 90 (80–100) | Sleep (25) | Physical function (2254) |
| 7 | Infant feeding/breastfeeding/breast health | 90 (80–96) | Physical function (23) | Sleep (2000) |
| 8 | Psychosocial support | 90 (80–93) | Motherhood experience (21) | Motherhood experience (1890) |
| 9 | Cognition | 85 (63–100) | Infant health (9) | Infant health (900) |
| 10 | Sleep | 80(70–95) | Fatigue (11) | Fatigue (770) |
| 11 | Fatigue | 70 (60–88) | Appearance/cosmetic factors (7) | Appearance/cosmetic factors (420) |
| 12 | Appearance/cosmetic factors | 60 (43–80) | Sexual function (7) | Sexual function (350) |
| 13 (lowest ranked) | Sexual function | 50 (50–70) | Cognition (2) | Cognition (170) |

Surgical/medical = surgical and medical factors; Appearance = appearance/cosmetic domain.

[a] All alisted domains were deemed to be important for inclusion by more than five stakeholders.

[b] NRS 0 = not at all important to recovery; 100 = vitally important to recovery.

[c] Infant health domain was introduced by third patient interviewed in Phase 4 (therefore reported median score is based on *n* = 26; 21 postpartum women and five anaesthetists.

[d] Analysed from transcripts following completion of all interviews; ranking according to number of stakeholders reporting items within a domain.

[e] Number of stakeholders (four) multiplied by perceived importance score (e.g. contraception, sexual health and sexuality (within the domain of sexual function) were discussed in four, two and one separate interviews, respectively, (total no. of stakeholders is seven). Median perceived importance of sexual function score was 50. Therefore, weighted score is $7 \times 50 = 350$.

**Table 4.**

Top 20 factors that help recovery reported by stakeholders with corresponding recovery domains

| Ranking | Factor | Frequency* | Domain |
|---|---|---|---|
| 1 | Family support/help | 16 | Psychosocial support |
| | Lactation/breastfeeding support | 16 | Feeding/Breastfeeding/Breast health |
| 3 | Partner support/help | 15 | Psychosocial support |
| 4 | Walk/exercise | 11 | Physical function |
| 5 | Getting outside | 8 | |
| | Social/friend support | 8 | Psychosocial support |
| 7 | Nutrition/eating well | 7 | Physical function |
| | Analgesia | 7 | Pain |
| | Kegel exercises/physiotherapy | 7 | Physical function |
| 10 | ‘Sleep when the baby sleeps’ | 6 | Sleep |
| 11 | Feeling of shared responsibility | 5 | Psychosocial support |
| | Group support/counseling | 5 | |
| 13 | Patience with self | 4 | Psychological distress |
| | Duration of paternity leave | 4 | Psychosocial support |
| 15 | Use of resources available | 3 | |
| | Protected time from baby | 3 | |
| | Stool softeners/laxatives | 3 | Surgical and medical factors |
| | Perineal cushion | 3 | Surgical and medical factors/Pain |
| | Rest | 3 | Fatigue |
| | Massage | 3 | Physical function |

The domains that related to these 20 factors in order of frequency were: psychosocial support (8); physical function (5); psychological distress (1); feeding/breastfeeding/breast health (1); surgical/medical factors (2); pain (2); fatigue (1); sleep (1).

*Frequency with which factor was mentioned during interview in response to an open-ended question.