Patient-reported outcome measures evaluating postpartum maternal health and well-being: a systematic review and evaluation of measurement properties

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OBJECTIVE: This study aimed to systematically review and evaluate postpartum health and well-being using patient-reported outcome measures across all domains of postpartum health using the COnsensus-based Standards for the selection of health Measurement INstruments guidelines.

DATA SOURCES: Based on a preprepared published protocol, a systematic search of PubMed, Embase, and CINAHL was undertaken to identify patient-reported outcome tools. The protocol was registered with the International Prospective Register of Systematic Reviews (registration number CRD42021283472), and this work followed the COnsensus-based Standards for the selection of health Measurement INstruments guidelines for systematic reviews.

STUDY ELIGIBILITY CRITERIA: Studies eligible for inclusion included those that assessed a patient-reported outcome measure examining postpartum women's health and well-being with no limitation on the domain. The included studies aimed to evaluate one or more measurement properties of the patient-reported outcome measure.

METHODS: Data extraction and the methodological assessment of the quality of the patient-reported outcome measure were assessed by 2 reviewers independently based on content validity, structural validity, internal consistency, cross-cultural validity or measurement invariance, reliability, measurement error, hypotheses testing for construct validity, and responsiveness, as defined by the COnsensus-based Standards for the selection of health Measurement INstruments. The standard used for content validity were the domains of importance to women in postpartum health and well-being proposed by the International Consortium for Health Outcomes Measurement. The outcome domains for patient-reported health status include mental health, health-related quality of life, incontinence, pain with intercourse, breastfeeding, and motherhood role transition. The quality of the methods was rated an overall rating of results, awarded a level of evidence, and assessed using the Grading of Recommendations, Assessment, Development, and Evaluations assessment tool, and a level of recommendation was awarded for each tool.

RESULTS: There were 10,324 studies identified in the initial search, of which 29 tools were identified from 41 eligible studies included in the review. Moreover, 21 tools were awarded an "A" grading of recommendation for use as a patient-reported outcome measure in postpartum women following the COnsensus-based Standards for the selection of health Measurement Instruments standards. Of the "A"-rated tools, 17 (80%) examined the domain of mental health, 5 examined health-related quality of life, 4 examined breastfeeding, and 6 represented role transition. No "A"-recommended tool examined postpartum incontinence or pain with intercourse. Of note, 3 tools did not cover domains as recommended by the International Consortium for Health Outcomes Measurement, and 5 tools were awarded a "B" rating, requiring more research before their recommendation for use. Here, most tools were awarded very low-moderate Recommendations, Assessment, Development, and Evaluations level of evidence. Moreover, the highest quality tool identified that covered multiple domains of postpartum health and well-being was the women's Postpartum Quality-of-Life Questionnaire.

CONCLUSION: This systematic review identified the best performing patient-reported outcome measures to assess postpartum health and well-being. No individual tool covers all 6 domains of postpartum health and well-being. Here, the highest quality tool found that covered multiple domains of postpartum health and well-being was the Postpartum Quality-of-Life

Ensuring quality healthcare is provided to women during pregnancy, and childbirth is key to improving health outcomes for mothers and their babies. Delivering patient-centered quality healthcare cannot be achieved without accurate, reliable, and relevant patient-reported information.[1,2] Patient-reported outcome measures (PROMs) are structured, validated questionnaires

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Questionnaire. The Postpartum Quality-of-Life Questionnaire captures 4 of 6 domains of importance to women, with domains of incontinence and sexual health unevaluated. The domain of urinary incontinence was represented by the International Consultation on Incontinence Questionnaire Short Form, which requires further psychometric analysis before its recommended use. Postpartum sexual health, not represented by any tool, necessitates the development of a patient-reported outcome measure. A postpartum patient-reported outcome measure would be best provided by a combination of tools; however, further research is required before its implementation.

Key words: maternal morbidity, maternity services, maternity service improvements, patient-centered obstetrical care, patient-reported outcome measures, postpartum, postpartum quality of life, quality obstetrical care, quality postnatal care

AJOG MFM at a Glance

Why was this study conducted?

This systematic review aimed to identify the best performing patient-reported outcome measures (PROMs) to assess postpartum health and well-being.

Key findings

PROMs highlighted domains where there is the greatest scope for improvement and can be used to detect a variation between providers and institutions. Currently, there is no consensus in the literature on postpartum PROMs.

What does this add to what is known?

Currently, a postpartum PROM would be best provided by a combination of high-performing tools.

that give an insight into the effect that an intervention or therapy has on the patient. PROMs support real-world clinical effectiveness assessment for different care models and interventions and can describe variations across sociodemographic and clinical groups.[3,4] In addition, PROMs highlight domains where there is the greatest scope for improvement and can be used to detect variation between providers and institutions that cannot be explained by differences in case mix; however, for learning to occur, a standardized framework for appraisal must occur.[5] The standardized use of PROM can allow agencies to better identify the focus of resources and services as tailored by the patient's need, increasing the quality and cost-effectiveness of the services provided.[2]

A recent shift toward patient-centered care is consistent with increasing PROM use globally.[3] The need for a PROM that can be used within maternity settings has been gaining attention in the literature over the past decade.[1,2,6] A maternity PROM has been identified as a priority by the Core Outcomes in Women's and Newborn's Health initiative, an international initiative led by research journal editors that was established to standardize core outcomes reported in women's health research.[7] To date, there is no consensus on a PROM within maternity care.[1,2,6] The development of a maternity PROM that covers antenatal, intrapartum, postpartum, and neonatal care is challenging. This work focused on a postpartum PROM that would facilitate patient-driven changes to the maternity system. Further work will be required to assess the tools' reliability and responsiveness over time.

We specifically focused on a postpartum PROM as a reflection of childbirth morbidity and maternal well-being after delivery. This period is ill defined with traditional postnatal care provided at 42 days (6 weeks) after delivery, per World Health Organization (WHO) recommendation,[8] but many researchers examining patient well-being and recovery to baseline recommend postnatal care at 6 to 12 months after delivery.[5] The International Consortium for Health Outcomes Measurement (ICHOM) has undertaken research evaluating domains of importance to women after delivery to a maximal timeframe of 6 months.[5] The proposed outcomes that matter the most according to the ICHOM are survival, morbidity, patient-reported health and well-being, and patient satisfaction with care. Within the patient-reported health and well-being outcome, the domains rated as most important to patients are (1) health-related quality of life (HRQoL), (2) incontinence, (3) pain with intercourse, (4) breastfeeding confidence and success, (5) role transition (mother-infant attachment and confidence in the role as a mother), and (6) mental health.[5]

Using terms, such as HRQoL and health and well-being, can be problematic as the definitions and the use of these terms have been indistinguishable at times in the literature.[9] Here, we used the concept of health and well-being as defined by the WHO, health as "a state of complete physical, social, and mental well-being and not merely the absence of disease or infirmity" and well-being as "encompass[ing] quality of life [QoL], as well as the ability of people and societies to contribute to the world in accordance with a sense of meaning and purpose."[10] The ICHOM used the domain of HRQoL as a domain of postpartum well-being of importance to women; here, we included any tool identifying and examining QoL or HRQoL in the postpartum setting.

Objectives

Research conducted using poor or unknown quality PROMs is both wasteful and unethical.[11] Selecting the best outcome measure instruments in a methodologically sound way is recommended by the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) and has guided the current study.

Therefore, this study aimed to systematically review, critically evaluate, and summarize outcome measurement tools that have been psychometrically evaluated to assess postpartum health and well-being across all domains of postpartum health and give recommendations for the most suitable tools for use. Using a postpartum PROM will give insight into women's health and well-being after maternity healthcare intervention during childbirth. This work has supported the call for maternity care PROMs that evaluate real-world clinical effectiveness and has highlighted domains where there is the greatest scope for change.

Methods

Protocol and registration

This systematic review follows the recommendations from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[12] and the COSMIN guidelines for conducting systematic reviews on a PROM.[11] The preprepared protocol for this review was published[13] and registered with the International Prospective Register of Systematic Reviews (identification number CRD42021283472).

Eligibility criteria, information sources, and search strategy

A systematic literature search was performed across PubMed, Embase, and CINAHL from inception of databases to November 2021. The search thread included construct search, population search with a measurement properties filter, and exclusion filter as recommended by COSMIN.[11] We chose to not include a "type of instrument" in our search strategy as it could have possibly excluded potential tools of interest; a full search strategy is available in the Appendix. We included studies in all languages. The screening of titles, abstracts, and full texts was performed by 2 review authors (L.J.O. and E.O.B.) independently to identify eligible studies.

The eligibility criteria for this review followed the COSMIN guidelines for systematic reviews of PROM recommendations. Eligible studies included generic and specific PROMs that assessed postpartum women's health and well-being, where the study sample included >50% postpartum women as advised by COSMIN.[14] The aim of the eligible study should be the evaluation of one or more measurement properties of the tool or the evaluation of the interpretability of the PROMs of interest. Studies that only use the PROM as a measurement instrument for the outcome of interest or in which the PROM was used for the validation of another instrument were excluded. Only full-text articles were included. All peer-reviewed studies with an assessment tool designed for patient completion were considered. The selection of titles and abstracts was performed by 2 reviewers independently (L.J.O. and E.O.B.) using the Rayyan[15] online reviewing system. If a study was deemed relevant by at least 1 reviewer, the full-text article was retrieved and screened.

Data extraction

The standardized data collection tool recommended by COSMIN was used by 2 authors (L.J.O. and E.O.B.) to extract the data from eligible studies. Information extracted included characteristics of the PROM, the included samples, and the domains of postpartum health and well-being.

Assessment of risk of bias and data synthesis

As recommended by COSMIN,[11] the methodological quality of the included studies was assessed using the risk of bias checklist. This included structural validity, internal consistency, cross-cultural validity or measurement invariance, reliability, measurement error, criterion validity, hypotheses testing for construct validity, and responsiveness. Each study was rated as very good, adequate, doubtful, or inadequate. The psychometric measurement properties of each study were rated against the updated criteria for good measurement, with each study rated as sufficient (+), insufficient (−), or indeterminate (?). The evidence was summarized per measurement property using a modified Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) approach, and the quality of the evidence was graded as high, moderate, low, or very low.

Adequate content validity (the degree to which the content of a PROM is an adequate reflection of the construct to be measured) was determined if a PROM evaluated an appropriate domain of postpartum health and well-being, as defined by the ICHOM. The domains for pregnancy and childbirth proposed by the ICHOM were used as a standard for content validity as no gold standard exists. These domains scored >70% agreement as part of their working groups Delphi process as being important outcome domains to be included in the standard set. Importantly, this working group included not only experts in the field but also patients, including subsequent patient focus groups, to identify any emerging topics not covered.[5]

Structural validity was evaluated as per the COSMIN taxonomy, using factor analyses or item response theory or Rasch analyses. Internal consistency for multiple studies was graded as sufficient if Cronbach α for most domains was at least 0.70. Reliability was deemed sufficient if the intraclass correlation coefficient score or weighted kappa was above 0.70. The measurement error identifies the smallest detectable change that signified a clinically significant difference in score results. Hypothesis testing on multiple studies was awarded as sufficient if most authors agreed with the tested hypothesis. No gold standard measure of postpartum health and well-being currently exists; therefore, criterion validity was not assessed as recommended by COSMIN. As described by COSMIN, responsiveness aims to show that the instrument truly measures changes in the constructs it intends to measure. A sufficient responsiveness level was awarded if 75% of the results were following the authors' proposed hypotheses as defined by COSMIN. The GRADE approach reviewed the following 4 factors: (1) risk of bias (ie, the methodological quality of the studies), (2) inconsistency (ie, unexplained inconsistency of results across studies),

(3) imprecision (ie, total sample size [downgraded 1 level if <100] of the available studies), and (4) indirectness (ie, evidence from different populations compared with evidence from the population of interest in the review). The included PROMs were classified into 3 categories: PROMs with evidence for sufficient content validity (any level) and at least low-quality evidence for sufficient internal consistency (recommended for use and given an "A" grading), PROMs categorized not in A or C (further validation needed and given a "B" grading," and PROMs with high-quality evidence for an insufficient measurement property (should not be recommended for use and were given a "C" grading).

Results

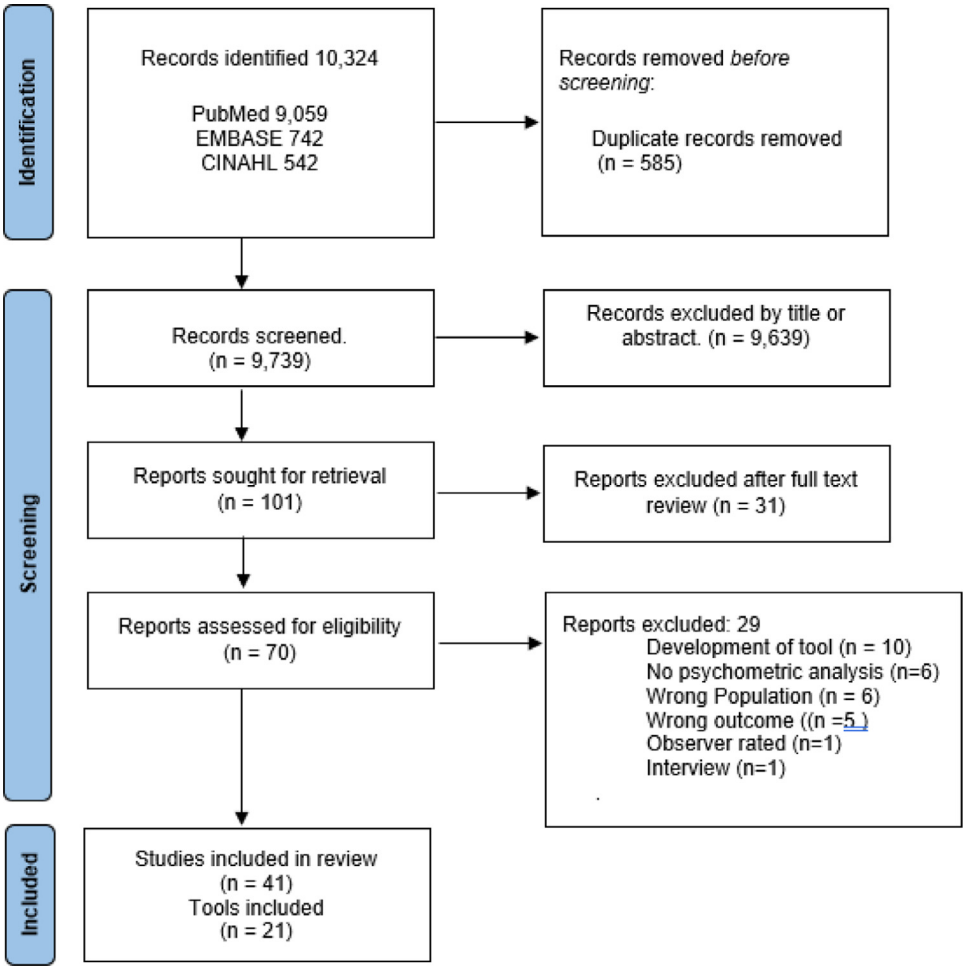
Study selection

There were 10,324 records identified in our search. After the removal of the duplicates, 9739 records were screened by 2 reviewers (L.J.O. and E.O.B.) independently by title and abstract. There were 101 records screened by full text by both reviewers, 70 of which were further assessed for eligibility. A total of 41 eligible studies were included in our review, evaluating 29 tools (Figure 1).

Study characteristics

The included PROMs evaluating postpartum health and well-being are summarized in Table 1. All the eligible studies evaluated the psychometric properties of the tool in the postpartum period. There were 29 unique tools identified from the 41 included studies.[16–49] The Edinburgh Postnatal Depression Scale (EPDS) had the most validation studies included (n=4) with a total number of 1755 patients.[16,17,23,44] This was followed by the City Birth Trauma Scale (n=3) with a total number of 1648 patients,[37,38,40] the Barkin Index of Maternal Functioning (BIMF; n=3) with 831 patients,[39,45,46] and the Postnatal Bonding Questionnaire (PBQ)

FIGURE
PRISMA flow diagram



PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

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TABLE 1
Included studies and properties of PROMs

Measure (tool)	Domains	Mode of administration	Author and year	No. of patients	Original language	Available translation	Time of postpartum assessment
EPDS	Mental health	Questionnaire	Gausia et al,[16] 2007 (Bangla) Montazeri et al,[17] 2007 (Iranian) Small et al,[44] 2007 (Australian Vietnamese and Filipino) Martin et al,[23] 2018	100 100 1310 245	English	Multiple	0–9 mo
PQOL	Mental health Role transition Breastfeeding HRQoL Physical function Social support	Questionnaire	Nikan et al,[30] 2016	500	Chinese	English Persian	0–12 mo after delivery
PROMIS GSF	Mental health HRQoL Physical pain and fatigue Social support	Questionnaire	Slavin et al, 2019a[33]	263	English	English	6 and 26 wk
13-PAFS	Mental health Physical fatigue Emotional function cognitive function	Questionnaire	Tsuchiya et al,[34] 2016	3632	English Chinese	English Chinese	After delivery to 6 mo
IFSAC	Role transition Household Social Personal care	Questionnaire	Noor et al,[35] 2015 McVeigh et al,[36] 2002	108 173	English	English	1–6 mo
PDSS	Mental health	Questionnaire	Vogeli et al,[51] 2018 Beck et al,[31] 2003	238 377	English	English, Spanish	2 wk to 15 mo
CBTS	Mental health	Questionnaire	Nakić Radoš et al, 2019[37] Sandoz et al,[38] 2022 Handelzalts et al,[40] 2018	603 541 504	Croatian French Hebrew	English	0–12 mo
MSPSS	Mental health Social support	Questionnaire	Denis et al,[41] 2015	148	English	English French	1–4 mo
EQ-5D	Mental health HRQoL Mobility Self-care Usual activity Pain or discomfort	Questionnaire	Jansen et al,[42] 2007	141	English	English	Days 1 and 2 6 mo
SF-36	Mental health Physical health	Questionnaire	Jansen et al,[42] 2007	141	English	English	0, 1, 3, and 6 wk
MFI	Fatigue	Questionnaire	Jansen et al,[42] 2007	141	Dutch	Dutch English	Days 1 and 2
PDPSI	Mental health Stress	Questionnaire	Razurel et al,[43] 2014	235	English	English French	0–2 d

(continued)

TABLE 1
Included studies and properties of PROMs *(continued)*

Measure (tool)	Domains	Mode of administration	Author and year	No. of patients	Original language	Available translation	Time of postpartum assessment
FAS	Fatigue	Questionnaire	Cano-Climent et al,[28] 2017	870	English	English Spanish	Day of discharge
BIMF	Breastfeeding Mental health Role transition Social support	Questionnaire	Aydin et al,[49] 2018 Barkin et al,[45] 2014 Ansariniaki et al,[46] 2021	235 346 250	English	English Turkish Persian	6–10 wk
PDS	Mental health	Questionnaire	Dikmen-Yildiz 2017[52]	858	English	Turkish	0–6 mo
PPQ	Mental health	Questionnaire	Hernández-Martínez et al,[47] 2021	432	English	English Spanish Chinese Korean	<6 mo
PBQ	Role transition	Questionnaire	Ohashi et al,[50] 2016 Wittkowski et al,[49] 2007 Busonera et al,[18] 2017	247 96 123	English	Japanese English	5 d to 1 mo
MIBS	Role transition Bonding	Questionnaire	Wittkowski et al,[49] 2007	96	English	English	2–4 d
NHP	Mental health	Questionnaire	Baghirzada et al,[19] 2013	125	English	English	2–4 d
WHOQOL-BREF	HRQoL	Questionnaire	Webster 2009[53]	320	English	English	2–4 d
TES-B	Mental health	Questionnaire	Stramrood et al,[20] 2010	428	English	English	2–6 mo
ICIQ-UI SF	Incontinence	Questionnaire	Slavin et al,[32] 2019	263	English	English	6–26 wk
MOS-SSS	Social support	Questionnaire	Norhayati et al,[21] 2015	144	Malay	English	0–1 mo
PASS	Mental health	Questionnaire	Jradi et al,[22] 2020	125	Arabic English	English	No specific time reported
PPSS-S	Role transition Breastfeeding Sense of security	Questionnaire	Escribano et al,[24] 2020	928	Swedish English	English	1–3 mo
WHO-5	Mental health HRQoL	Questionnaire	Mortazavi et al,[25] 2015	341	English	English Farsi	2 mo
MMCL	Mental health	Questionnaire	McGlynn et al,[26] 2020	504	English	English	0–3 mo
ObsQOR-10	Postpartum Recovery Breastfeeding	Questionnaire	Sultan 2020[27] Sultan et al, 2020a[29]	215 123	English	English	72 h to 3 d
PSS-SR	Mental health Postpartum PTSD	Questionnaire	Stramrood et al,[20] 2010	428	English	English	2–6 mo

13-PAFS, 13-Item Postnatal Accumulated Fatigue Scale; *BIMF*, Barkin Index of Maternal Functioning; *CBTS*, City Birth Trauma Scale; *EPDS*, Edinburgh Postnatal Depression Scale; *FAS*, Fatigue Assessment Scale; *HRQoL*, health-related quality of life; *ICIQ-UI SF*, International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form; *IFSAC*, Inventory of Functional Status After Childbirth; *MFI*, Multidimensional Fatigue Inventory; *MIBS*, Mother-Infant Bonding Scale; *MMCL*, Maternal Mood Checklist; *MOS-SSS*, Medical Outcome Study Social Support Survey; *MSPSS*, Multidimensional Scale of Perceived Social Support; *NHP*, Nottingham Health Profile; *ObsQOR-10*, Obstetric Quality of Recovery-10; *PASS*, Perinatal Anxiety Screening Scale; *PBQ*, Postnatal Bonding Questionnaire; *PDPSI*, Postdelivery Perceived Stress Inventory; *PDSS*, Postpartum Depression Screening Scale; *PPQ*, Perinatal Post-Traumatic Stress Disorder Questionnaire; *PPSS-S*, Parent's Postnatal Sense of Security Scale; *PQOL*, Postpartum Quality-of-Life Questionnaire; *PROMIS GSF*, Patient-Reported Outcomes Measurement Information System Global Short Form; *PROM*, patient-reported outcome measure; *PSS-SR*, PTSD Symptom Scale Self-Report; *PDS*, Posttraumatic Diagnostic Scale in Postpartum; *TES-B*, Traumatic Event Scale-B; *SF-36*, 36-Item Short Form Health Survey; *WHO-5*, 5-Item World Health Organization Well-Being Index; *WHOQOL-BREF*, World Health Organization Quality of Life Brief Version.

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TABLE 2
Pooled results for tools

Variable	Content validity	Structural validity			Internal consistency			Cross cultural validity			Reliability			Measurement error			Hypothesis testing			Responsiveness			Recommendation
		Methods	Results	Grade	Methods	Results	Grade	Methods	Results	Grade	Methods	Results	Grade	Methods	Results	Grade	Methods	Results	Grade	Methods	Results	Grade	
MMCL	+	Very good	+	Low	Very good	+	Low	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very good	+	Low	Not assessed	+	Very low	A
WHO-5	+	Very good	+	Moderate	Very good	+	Moderate	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very good	+	Moderate	Not assessed	+	Moderate	A
CBTS	+	Very good	+	Very Low	Very good	+	High	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very Good	+	High	Not Assessed	?	Very low	A
EPDS	+	Very good	+	Moderate	Very Good	+	Moderate	Not assessed	?	Very Low	Very good	+	Moderate	Not assessed	?	Very low	Very good	+	Moderate	Not assessed	?	Very Low	A
PQOL	+	Very good	+	High	Very good	+	High	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	A
PROMIS GSF	+	Very good	+	High	Very good	+	High	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	A
PDSS	+	Very good	–	Moderate	Very good	+	Moderate	Not assessed	?	Very low	Very good	+	Moderate	Not assessed	?	Very low	Very good	?	Moderate	Very good	+	Moderate	A
EQ-5D	+	Not assessed	?	Very low	Not assessed?		Very low	Not assessed	?	Very low	Inadequate	?	Very low	Not assessed	?	Very low	Very good	+	High	Very good	+	High	B
SF-36	+	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	Inadequate	?	Very low	Not assessed	?	Very low	Very good	+	High	Very good	+	High	A
PDPSI	+	Very good	+	Moderate	Very good	+	Moderate	Not assessed	?	Very low	Adequate	–	Moderate	Not assessed	?	Very low	Adequate	+	Moderate	Not assessed	?	Very low	A
FAS	?	Very good	+	Moderate	Very good	+	Moderate	Not assessed	?	Very low	Inadequate	–	Moderate	Not assessed	?	Very low	Very good	+	Moderate	Not assessed	?	Very low	C
Barkin Index of Maternal Functioning	+	Very good	+	Moderate	very good	+	Moderate	Not assessed	?	Very low	Very good	+	Very low	Not assessed	?	Very low	Very good	+	Low	Not assessed	?	Very low	A
PPQ	+	Very good	–	Low	Very good	+	Low	Not assessed	?	Very low	Inadequate	?	Low	Not assessed	?	Very low	Very good	+	Low	Not assessed	?	Very low	A
WHOQOL-BREF	+	Not assessed	?	Very low	Very good	+	Moderate	Not assessed	?	Very low	Very good	?	Moderate	Not assessed	?	Very low	Very good	+	Moderate	Not assessed	?	Very low	A
PASS	+	Inadequate	?	Very low	Very good	+	Low	Not assessed	?	Very low	Inadequate	+	Low	Not assessed	?	Very low	Very good	+	Low	Not assessed	?	Very low	A
NHP	+	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	A
TES-B	+	Not assessed	?	Very low	Very good	+	Low	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very good	–	Low	Not assessed	?	Very low	A
PSS-SR	+	Not assessed	?	Very low	Very good	+	Low	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very good	–	Low	Not assessed	?	Very low	A
PDS	+	Very good	?	Low	Very good	+	Low	Not assessed	?	Very low	Very good	+	Low	Not assessed	?	Very low	Very good	+	Low	Very good	+	Moderate	A
MOS-SSS	?	Very good	+	Very low	Very good	+	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Inadequate	–	Very low	Not assessed	?	Very low	C
MSPSS	+	Very good	–	Moderate	Very good	+	Moderate	Not assessed	?	Very low	Inadequate	–	Moderate	Not assessed	?	Very low	Adequate	+	Moderate	Doubtful	?	Very low	A
PPSS-S	+	Very good	+	Moderate	Very good	+	Moderate	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Adequate	+	Moderate	Not assessed	?	Very low	A
IFSAC	+	Not assessed	?	Very low	Very good	–	Very low	Not assessed	?	Very low	Very good	–	Moderate	Not assessed	?	Very low	Very good	+	Moderate	Not assessed	?	Very low	B
ObsQOR-10	+	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	Very good	–	Very low	Very good	+	High	A
PBQ	+	Not assessed	?	Very low	Very good	+	Low	Not assessed	?	Very low	Very good	+	Moderate	Not assessed	?	Very low	Very good	+	Low	Not assessed	?	Moderate	A
MIBS	+	Not assessed	?	Very low	Very good	–	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very good	+	Very low	Not assessed	–	High	B
ICIQ-UI SF	+	Inadequate	?	Very low	Inadequate	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very good	+	High	Very good	–	High	B
13-PAFS	+	Very good	+	Moderate	Very good	–	Moderate	Not assessed	?	Very low	Not assessed	?	Very low	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	B
MFI	?	Not assessed	?	Very low	Very good	+	High	Not assessed	?	Very low	Inadequate	?	Very low	Inadequate	?	Very low	Very good	+	High	Very good	+	High	C

Methods rating is presented as follows: very good, adequate, doubtful, inadequate, or not assessed. Overall rating is presented as follows: sufficient (+), insufficient (–), inconsistent (+ or –), or indeterminate (?).

Recommendation:

"A" indicates PROMs with evidence for sufficient content validity (any level) and at least low-quality evidence for sufficient internal consistency. "B" indicates PROMs categorized not in "A" or "C." "C" indicates PROMs with high-quality evidence for an insufficient measurement property or PROMS with inadequate validity.

13-PAFS, 13-Item Postnatal Accumulated Fatigue Scale; *BIMF*, Barkin Index of Maternal Functioning; *CBTS*, City Birth Trauma Scale; *EPDS*, Edinburgh Postnatal Depression Scale; *FAS*, Fatigue Assessment Scale; *HRQoL*, health-related quality of life; *ICIQ-UI SF*, International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form; *IFSAC*, Inventory of Functional Status After Childbirth; *MFI*, Multidimensional Fatigue Inventory; *MIBS*, Mother-Infant Bonding Scale; *MMCL*, Maternal Mood Checklist; *MOS-SSS*, Medical Outcome Study Social Support Survey; *MSPSS*, Multidimensional Scale of Perceived Social Support; *NHP*, Nottingham Health Profile; *ObsQOR-10*, Obstetric Quality of Recovery-10; *PASS*, Perinatal Anxiety Screening Scale; *PBQ*, Postnatal Bonding Questionnaire; *PDPSI*, Postdelivery Perceived Stress Inventory; *PDSS*, Postpartum Depression Screening Scale; *PPQ*, Perinatal Post-Traumatic Stress Disorder Questionnaire; *PPSS-S*, Parent's Postnatal Sense of Security Scale; *PQOL*, Postpartum Quality-of-Life Questionnaire; *PROMIS GSF*, Patient-Reported Outcomes Measurement Information System Global Short Form; *PROM*, patient-reported outcome measure; *PSS-SR*, PTSD Symptom Scale Self-Report; *PDS*, Posttraumatic Diagnostic Scale in Postpartum; *TES-B*, Traumatic Event Scale-B; *SF-36*, 36-Item Short Form Health Survey; *WHO-5*, 5-Item World Health Organization Well-Being Index; *WHOQOL-BREF*, World Health Organization Quality of Life Brief Version.

O'Byrne. Postpartum patient reported outcome measures: systematic review and evaluation. Am J Obstet Gynecol MFM 2022.

with 466 patients.[18,48–50] There were 17 studies that examined the domain of mental health, 6 studies that evaluated role transition to motherhood, and 5 studies that examined HRQoL. Of note, 1 tool examined urinary incontinence in postpartum women. The incontinence domain recommended by the ICHOM also included anal incontinence, but there is no psychometric evaluation study in postpartum women with an anal incontinence tool. Additional domains represented in the evaluated tools not proposed by the ICHOM included social support, postpartum recovery, and fatigue tools.

Risk of bias in assessing methodological quality and overall rating of individual studies

There were 41 individual studies included in the review. The risk of bias checklist developed by COSMIN was used for assessing the individual methodological quality of eligible studies. The results of the 8 measurement properties examining the risk of bias are included in appendix sTable 1. Many of the studies that assessed psychometric properties of a tool scored "very good" across the 8 measurement properties assessment methods following the COSMIN recommendations. Very few studies examined all 8 psychometric properties of the tools, with many only examining structural validity, internal consistency, and hypothesis testing. No study examined cross-cultural validity appropriately using multiple factor group analysis or differential item functioning, and measurement error was not assessed as set out by COSMIN using the smallest detectable change, limits of agreement, or minimal important change. The overall quality rating of individual study methods, as guided by the COSMIN criteria for good measurement properties, is also included in sTable 1.

Psychometric measurements properties for the included patient-reported outcome measures

Individual study results for risk of bias and good measurement properties are pooled to give the tool an overall rating. The modified GRADE approach by COSMIN was used to award a level of evidence presented in appendixs Table 2. A summary of these results is presented in Table 2.

The most frequently assessed psychometric properties for the pooled results for tools were structural validity and internal consistency as seen in Table 2. Most tools, which examined these properties, scored "very good" on their methods as proposed by COSMIN. No tool had included studies that had evaluated cross-cultural validity, which refers to the degree to which the performance of the items on a translated or culturally adapted instrument is an adequate reflection of the performance of the items of the original version of the instrument. There were 8 tools that scored as having had sufficient reliability: EPDS, Postpartum Quality-of-Life Questionnaire (PQOL), Postpartum Depression Screening Scale (PDSS), BIMF, Obstetric Quality of Recovery-10 (ObsQoR-10), Posttraumatic Diagnostic Scale in Postpartum (PDS), PBQ, and Perinatal Anxiety Screening Scale (PASS). The measurement error was not examined in the included studies.

Hypothesis testing was performed in all but one tool, Medical Outcome Study Social Support Survey (MOS-SSS).[21] Most often, studies compared their tool and its performance against a selected comparator tool for hypothesis testing. Of the 29 tools, 11 examined the property of responsiveness: Maternal Mood Checklist (MMCL), EPDS, Multidimensional Scale of Perceived Social Support (MSPSS), Patient-Reported Outcomes Measurement Information System Global Short Form (PROMIS GSF), PDSS, ObsQoR-10, EQ-5D, 36-Item Short Form Health Survey, Multidimensional Fatigue Inventory (MFI), PDS, and International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF).

Grading of Recommendations, Assessment, Development, and Evaluations assessment of included patient-reported outcome measures

The GRADE result was awarded for the overall tool after the study result of each psychometric property had been pooled; the pooled results for tools are presented in Table 2. The GRADE level of evidence for structural validity and internal consistency was awarded "high" for 2 tools, the PQOL and PROMIS GSF, with the other included tools scoring moderate to very low. Reliability had 2 tools that scored "high," the PQOL and ObsQoR-10, with most tools scoring very low. Hypothesis testing and responsiveness had the most "high" scores, 9 and 6, respectively. Overall, the PQOL scored the highest on the measurement properties assessed, followed by the PROMIS GSF.

Recommendations

The recommendations for use from COSMIN are PROMs with evidence for sufficient content validity (any level) and at least low-quality evidence for sufficient internal consistency ("A"). There were 21 tools that had an "A" recommendation, meaning that they can be recommended for use and the results can be trusted. The domain of mental health was the most represented domain with 17 of 21 "A"-recommended tools, all except MSPSS, Parent's Postnatal Sense of Security Scale (PPSS-S), ObsQoR-10, and PBQ. HRQoL was represented by 4 "A"-recommended tools: 5-Item World Health Organization Well-Being Index (WHO-5), PQOL, PROMIS GSF, and World Health Organization Quality of Life Brief Version (WHOQOL-BREF). The domain of breastfeeding represented 4 "A"-recommended tools PROMIS GSF, BIMF, PPSS-S, and ObsQoR-10. The domain of role transition was recommended by 3 "A"-recommended tools: PQOL, BIMF, and PPSS-S. Incontinence and pain with intercourse were not covered by any "A"-rated tool. There were 3 tools in our review (covering fatigue and social support in isolation) that did not have sufficient content validity and were awarded a "C" recommendation; these were the fatigue assessment scale (FAS),[28] MFI,[42] and MOS-SSS.[21] The tools recommended as "B" require further evaluation of their quality before recommendation for use.

Of the "A"-recommended tools, the PQOL covered the most domains, including HRQoL, mental health, role transition, and breastfeeding. It scored sufficiently for structural validity, internal consistency, reliability, and hypothesis testing, with a high grade of evidence. However, the PQOL did not cover all domains of postpartum health and well-being. Furthermore, the PROMIS GSF and WHOQOL-BREF scored highly, with PROMIS GSF covering the domains of mental health and HRQoL and WHOQOL-BREF covering the domain of HRQoL.

Comment

Principal findings

There were 21 PROMs found to be recommended for use in postpartum women. The most frequently represented domain was postpartum mental health, with 17 of 21 tools covering mental health. The only 2 tools that did not cover this domain were PPSS-S, which focused on postpartum security, and ObsQoR-10, which evaluated postpartum recovery. HRQoL was represented by 4 "A"-recommended tools, including the WHO-5, PQOL, PROMIS GSF, and WHOQOL-BREF. The domain of breastfeeding was also represented by 4 "A"-recommended tools, including PROMIS, BIMF, PPSS-S, and ObsQoR-10, whereas the domain of role transition was represented by PQOL, BIMF, and PPSS-S.

Comparison with existing literature

To date, there is no consensus on a PROM within maternity care.[1,2,6] We have chosen to include all tools that examined health and well-being in the postpartum period in this review. The ICHOM recommended domains of importance to postpartum women, including HRQoL. HRQoL has multiple competing definitions in the literature as Karimi et al[9] have explored, which often overlap with the concepts of QoL and health.[9,54,55] Here, any tool that identified examining the concept of HRQoL or QoL was included in this domain.

We chose to use the broader concept of health and well-being as the overarching approach to this topic. The WHO has defined health as "a state of complete physical, social, and mental well-being and not merely the absence of disease or infirmity" and well-being as "encompass[ing] [QoL], as well as the ability of people and societies to contribute to the world in accordance with a sense of meaning and purpose."[10] This broader definition of all aspects of health, QoL, and a person's ability to interact with the world around them aligned with the concept of a postpartum PROM.

There were 3 tools that did not meet the criteria for sufficient content validity following ICHOM-proposed domains. These were the FAS[28]; the MFI, both of which are generic tools designed to assess fatigue[42]; and the MOS-SSS, a generic tool examining social, emotional, and informational support.[21]

There was no study examining the domain of sexual health psychometrically evaluated in postpartum women. The domain most underrepresented in our study was the postpartum incontinence domain. The ICIQ-UI SF used for urinary incontinence was the only 1 psychometrically evaluated incontinence tool study in postpartum women by Slavin et al.[32] The Slavin study aimed to evaluate perinatal incontinence, which included urinary and fecal incontinence, but the tool examining anal incontinence (Wexner Scale) could not be evaluated as there were insufficient numbers of women identified as suffering with anal incontinence after delivery.

The tool with the highest rating that covered the most domains was the PQOL. The PQOL was designed in China by Zhou et al,[56] with a robust development procedure, including the Delphi process with expert and postpartum women involvement and item selection using multiple COSMIN-recommended methods (expert scoring, factor analysis, coefficient of variation, item-removed Cronbach alpha, item-expected domain correlation, item-unexpected domain correlation, and test-retest correlation analysis). The study included in this systematic review was performed in an Iranian cohort by Nikan et al.[30] The PQOL scored highly in structural validity, internal consistency, reliability, and hypothesis testing but did not assess cross-cultural validity or responsiveness. The PQOL is a 40-item tool that uses a 5-point Likert scale; it is freely available and easy to administer, with a completion time of 5 to 10 minutes for patients to score. Nikan et al[30] reported the ability to discriminate between delivery type, postpartum depression, and socioeconomic status. The limitation of this tool is that it does not cover sexual health or incontinence, which are both important domains for postpartum health.

Strengths and limitations

This study examined the psychometric properties of the available tools evaluating postpartum health and well-being.

The evaluation of individual domain-specific PROMs has been previously published, for example, mental health,[51] postpartum recovery,[57] and incontinence,[32] but no work exists examining multidomain PROMs or a combination of PROMs suitable to universally examine postpartum health and well-being. Moreover, we have expanded on the domains put forward by the work of the ICHOM.

This research has also highlighted areas requiring further research, specifically psychometric evaluation of tools examining postpartum sexual health and incontinence.

Previous reviews on PROM for pregnancy and childbirth[1,2] highlighted the lack of PROM in this area, with Dickenson et al[1] concluding that a variety of assessment tools could help develop a specific PROM on this topic. This research has been able to make recommendations regarding the most suitable tools currently available for use as a suitable postpartum PROM. This work has fulfilled many calls for the development of a postpartum PROM to improve the quality of maternity care and reduce morbidity and mortality for women.[1,2,5]

A limitation of this study was that the only tools that have been psychometrically evaluated were included in this review. There may be appropriate tools

that have not undergone psychometric evaluation to date that were not included in this research that could be used as a postpartum PROM. Secondly, despite the ICHOM having patient involvement and focus groups to identify the domains of importance to postpartum women, these may not cover all the domains of importance to all postpartum women. Important tools that have been graded highly by their psychometric properties may be beneficial in including in a postpartum PROM, such as those examining social support and fatigue. Such tools have been included in this work but have not been graded as such.

Conclusion and implications

Using high-quality PROM in this population can lead to service provision changes of value to women. No universal PROM has been used to longitudinally evaluate women's health and well-being across delivery groups and differing morbidities to identify areas of change. No single highly rated tool covers all domains of postpartum health. The future direction of this work can achieve this by specifically completing the validation of the postpartum incontinence tool, the ICIQ-UI SF, and incorporating a sexual health evaluation assessment with the use of the top-rated multidomain tool, the PQOL, blending appropriately assessed tools to achieve a clinically valuable and validated PROM.

PROMs must be incorporated into women's healthcare to drive patient-centered change with clinically significant differences in outcomes for women.[1,2,5] To date, a postpartum PROM that covers all domains of postpartum care would be most sufficiently produced by using an assembly of highly rated tools that assess the domains of importance to women in postpartum care. The feasibility and acceptability of such tools would require further exploration. ■

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.ajogmf.2022.100743.

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