

RESEARCH ARTICLE

Measurement instruments for parental stress in the postpartum period: A scoping review

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Abstract

Background

Parenting stress is a particular type of stress that is conceptualized as a negative psychological response to the numerous obligations associated with raising children. Despite a considerable increase in research on parenting stress, little attention has been given to the ways parenting stress are measured.

Objectives

This scoping review aimed to provide an overview of available instruments measuring parental stress and to describe their psychometric properties.

Methods

We conducted a scoping review in accordance with international guidelines for scoping reviews. The main search strategy was searches in seven electronic databases. Pairs of reviewers selected relevant studies based on predetermined inclusion and exclusion criteria. Studies had to report one or more psychometric properties of an instrument measuring stress in parents with children 0–12 months. For each included study, we collected information relevant to the review question, guided by the COnsensus based Standards for the selection of health status Measurement INstruments (COSMIN). Finally, we collated, summarized, and reported the findings descriptively.

Results

From 2164 unique record, 64 studies from 24 countries were included. They described 15 instruments, of which four were generic and eleven parental-specific self-administered instruments. Only two studies examined parental stress among fathers. Eleven of the studies were validation studies, but they only described seven of the 15 instruments. Internal consistency was the only information provided by 73.4% of the included studies. None of the instruments had information on all measurement properties as per the COSMIN criteria, and

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there was no information about measurement error, responsiveness, or interpretability for any of the 15 instruments.

Discussion

There are presently 15 instruments with some associated psychometric information being used to measure parental stress among parents with young children, but the amount of information on the instruments' psychometric properties is slight. There is a need for further research.

Introduction

The birth of a child is a joyous event for most parents. However, the postpartum period, which includes the first-year post birth, is also recognized as a period of major transition that can be deeply emotional and associated with considerable distress. Infant care demands and changing social role expectations are factors that are known to increase parents' level of stress [1]. Parenting stress is defined as a particular type of stress and is conceptualized as a negative psychological response to the numerous obligations associated with raising children, and its presence is the rule rather than the exception [2–4].

In recent decades, parenting stress has gained increased importance in clinical practice and research [5]. When conducting searches for a systematic review and using the search terms 'stress' and 'parent', Louie and colleagues [5] found 301 publications in the 1970s, with the number increasing to 4436 publications in the first decade of the 2000s [5]. This reflects a dramatic increase over the last 40 years in research efforts to understand parenting stress. Today, stress is established as an important factor with regard to the well-being of parents, children, and families. However, despite a considerable increase in the number of publications, it seems that little attention has been given to the ways parenting stress are measured, especially in relation to parents with young children [6,7]. The postpartum period is a crucial period in parents' lives [8,9]. It represents a major life transition for most parents [9], while also providing a unique opportunity to screen for stress given parents' regular contact with their public health nurse during the first year.

Previous research has emphasized the need to develop more complex and comprehensive models to examine the effects of different types of stressors in parents [10,11]. Consequently, many parenting interventions measure parental stress levels and a variety of instruments intended to map stress in connection with the parental role, are used [12–17]. A recent review of parenting stress in families where the child was 2–17 years and had clinical issues found that the psychometrics varied across instruments. The combined findings supported the existence of a parenting stress construct and further confirmed the relevance of parenting stress to family functioning, youth psychopathology, and mental health interventions [7]. Another scoping review identified and described interventions for reducing caregiver stress in families where the child suffers from serious illness [6]. The researchers found 49 studies representing six domains of interventions, and a wide variety of measures and standardized questionnaires being used for caregiver stress [6]. To our knowledge, however, there are no reviews providing an overview of available stress measurement instruments, and their psychometric characteristic, used for parents in the postpartum period who have received healthy children. Hence, a scoping review is needed to, one, give a valid overview of existing stress measurements and their psychometric properties, used for parents with children 0 to 12 months; two, facilitate the

choice of an appropriate stress measure fit for purpose; and three, illustrate the gaps and needs in research.

Objectives

The overall aim of this scoping review is to provide an overview of available instruments measuring parental stress throughout the postpartum period, and describe their psychometric properties related to the relevant population. Our two research questions were: What instruments are available to measure parental stress during the postpartum period? What are the psychometric properties of these instruments?

Methods

Scoping reviews are used to present a broad overview of the evidence pertaining to a topic, generally with the aim of determining what range of evidence is available and addressing a broader research question [18,19]. We conducted the review in accordance with the five-stage methodological framework proposed by Arksey and O'Malley [19], and further enhanced by Levac, Colquhoun [18]: Specification of the research question, identification of relevant literature, selection of relevant studies, charting data, and collating, summarizing and reporting of results.

Specification of the research question

We extensively scoped and read existing literature before determining the research question. The research question and a priori methodology was specified in a protocol, registered in Cris-tin, published in Research Gate [20] and available by contacting the first author.

Identification of literature

Our main search strategy was searches in electronic databases. The search strategy was developed by the first author and a search specialist. In March 2020, they conducted a systematic search in seven databases: Medline (Ovid), CINAHL, EMBASE (Ovid), Health and Psychosocial Instruments, PsycINFO (Ovid), SveMed+, and Web of Sciences. The search strategy as first formulated in Medline and adapted to the other six databases was:

'postnatal' OR 'postpartum care' OR 'perinatal' OR 'postnatal care' OR 'perinatal care' OR 'postpartum' OR 'postpartum period' OR 'postnatal period' AND 'parental stress' OR 'parental distress' OR 'maternal stress' OR 'maternal distress' OR 'Stress+' OR 'Stress, Psychological+' AND 'Psychometrics' OR 'measurement' OR 'Weights and Measures+' OR 'Scales'

In addition, we conducted a hand search in the reference lists of included publications.

Selection of relevant studies

We selected relevant studies based on predetermined inclusion and exclusion criteria. We included any study design provided the study measured and reported on stress among parents (mothers and fathers) of children 12 months or younger. We chose the whole first year postpartum, because the first year after birth is a crucial period in parents' lives [8,9], that represents a major life transition for most parents [9]. The study had to report one or more psychometric properties of an instrument to measure stress, understood as described in the introduction. While we only included studies about instruments that measured stress, because

also the word ‘distress’ is used by some researchers in the field, we included this alternative terminology in the search to ensure that we did not miss relevant studies. In this study, psychometric property was understood as described by the COnsensus based Standards for the selection of health status Measurement INstruments (COSMIN) definition of domains [21], reliability, validity, and responsiveness. The measure of stress had to be undertaken during the postpartum period, which we defined as up to 12 months after birth. Studies had to be published between the years 1995–2020 and written in English or a Scandinavian language. These are the languages mastered by the author team and there were no funds available for study translations.

We excluded studies on parents with seriously ill children (e.g.: cancer, diabetes, preterm), parents who were seriously ill (e.g.: cancer, HIV), parents younger than 18 years, parents with children older than 12 months. Serious illness was defined as “*a health condition that carries a high risk of mortality and either negatively impacts a person’s daily function or quality of life or excessively strains the caregiver*” [22].

All records identified in our search were imported into EndNote and duplicates were deleted. We imported all references into Rayyan systematic review software, which is a web-tool designed to help researchers working on scoping reviews and other knowledge syntheses [23]. Using Rayyan, two authors independently screened all titles and abstracts for relevance against the inclusion and exclusion criteria. They promoted all abstracts they considered relevant to full text screening. Having obtained the publications in full text, two independent reviewers assessed their relevance against the inclusion criteria. Studies that met all eligibility criteria were included. At both screening levels, discrepancies or difficulties were deliberated and consensus reached by discussion.

Charting data

The process of charting data involves applying a common analytical framework to all the included research reports, and collecting on each study standard information relevant to the review question, which is entered onto a data charting form [19]. Using a data extraction sheet (charting table), the first reviewer extracted information, which was checked for accuracy and completeness by another reviewer. The final data extraction sheet was developed after pilot testing it on 11 publications and modifications agreed by two reviewers. We extracted the following data from all publications: year of publication, study setting/country, number of participants, study population characteristics, timepoint of measurement, and study design. Extracted characteristics about the instruments were: instrument name, author, construct(s), target population, method of administration, recall period, (sub)scales, number of items, response options, range of score, and psychometric information. We also extracted data regarding the following measurement properties, based on the COSMIN guidance: internal consistency, reliability, measurement error, content validity, structural validity, hypotheses testing, cross-cultural validity, criterion validity, responsiveness, and interpretability [21]. In accordance with scoping review methodology, we did not perform methodological quality assessments of the included studies [18,19].

Collating and summarizing results

Finally, in the last step, we collated, summarized, and reported the findings descriptively. We grouped the data into clusters according to instruments and measurement properties, following a data driven approach [19,24]. We described and categorized the psychometric results reported in the studies in accordance with the COSMIN definitions of measurement properties [21]. After conducting descriptive analyses by using frequencies and cross-tabulations, we

recorded findings and discussed implications of the findings. We have reported in accordance with PRISMA Extension for Scoping Reviews [25].

Results

Search results

The electronic database searches and the hand searches yielded a total of 9026 records. After deleting duplicates, we screened titles and abstracts. Three publications were not found in full text, and we excluded 198 publications after full text screening. All publications read in full text were in English. A complete list of excluded publications read in full text is available upon request from the corresponding author. We included 64 studies. The study selection procedure is shown in PRISMA Flow Diagram [26], Fig 1.

Description of included studies

The 64 included studies were all written in English and published between 1999 and 2020, with half being published since 2015 (Table 1). The studies were conducted in twenty-four different countries (Australia, Belgium, Canada, Chile, China, Denmark, Finland, Germany, Ghana/Côte d'Ivoire, Hong Kong, Indonesia, Iran, Israel, Italy, Japan, Lebanon, Norway, Portugal, Spain, Switzerland, Taiwan, Turkey, UK and US). A third of the included studies were conducted in Europe. The sample sizes ranged from 40 to 3005 participants, with a total of 26,783 participants. A third had a sample size greater than 500 participants. Only two studies focused solely on parental stress among fathers, 17 studies looked at both mothers and fathers, while the remaining 45 studies examined stress among mothers. Across the studies, 81 measurements were conducted in the first year postpartum. Most (55 measurements, 68%) were

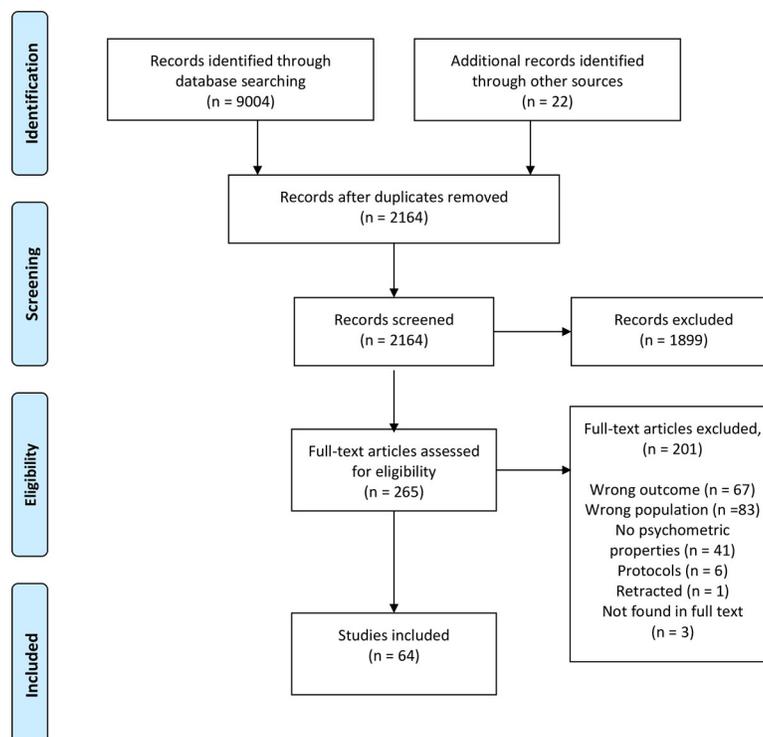


Fig 1. PRISMA flow diagram.

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Table 1. Summary characteristics of the included studies (N = 64).

Characteristics	Studies N (%)
Year of publication:	
1999–2004	6 (9)
2005–2009	7 (11)
2010–2014	19 (30)
2015–2020	32 (50)
Country	
Australia	3 (4.7)
Belgium	2 (3.1)
Canada	3 (4.7)
China	3 (4.7)
Iran	2 (3.1)
Italy	5 (7.8)
Norway	3 (4.7)
Portugal	3 (4.7)
Spain	3 (4.7)
Switzerland	2 (3.1)
Taiwan	9 (14.1)
USA	14 (21.9)
Other (one study from each country)	12 (18.8)
Number of participants	
<50	2 (3)
50–99	7 (11)
100–499	35 (55)
500–999	15 (23)
>1000	5 (8)
Population	
Fathers	2 (3)
Mothers	45 (70)
Fathers and mothers	17 (27)
Study design	
Cross-sectional	24 (37.5)
Longitudinal	21 (33)
Validation	11 (17)
Other	8 (12.5)
Time of measurement of stress ¹	N = 81 (%)
Immediately after birth	8 (9.8)
0–6 months postpartum	55 (67.9)
7–12 months postpartum	12 (14.8)
Within the first 12 months postpartum	6 (7.4)

¹ = more than one answer possible.

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conducted 0–6 months postpartum, while eight were conducted immediately after birth and 12 were conducted 7–12 months postpartum. There were different study designs, and 11 of the 64 studies were validation studies, meaning a study that examines the extent to which an instrument measures what it is supposed to measure [27]. These studies validated seven of the 15 identified instruments. Parental stress was assessed both to reveal parents' perspectives and

help to monitor intervention responses. Instruments for parental stress were commonly used in cross-sectional and longitudinal studies as either primary or secondary outcome measures. In cross-sectional studies, parental stress scales were used to evaluate parental stress and determine its relationship with relevant sociodemographic and health-related variables. In longitudinal design, parental stress scales were used to measure changes in parental stress over time as a result of exposure to certain conditions.

Descriptive characteristics of included instruments

Tables 2 and 3 summarize the characteristics of the included instruments. We identified 15 different instruments measuring parental stress among parents within the postpartum period (children 0 to 12 months). The target population for 11 of the instruments were parents or mothers, while the remaining four instruments were generic stress scales (Perceived Stress Scale, Depression Anxiety Stress Scale, Social Readjustments Rating Scale, Stress Appraisal Measure).

All instruments were self-report scales. The number of instrument items ranged from 4 to 123 ($M = 32.03$, $SD = 28.45$). The Perceived Stress Scale (Perceived SS) had the version with the least number of items (4 items), whereas one version of the Parenting Stress Index (PSI) [28] had the most (123 items).

Five of the 15 instruments operated with several item versions (Table 2), with varying degrees of explanation related to the different versions: PSI, Perceived SS, Depression Anxiety

Table 2. Characteristics of the included instruments.

Name of instrument, author (year of development)	Used by how many studies (items-version)	Construct and target population	Recall period	(Sub) scale (s)/ domain (number of items)	Response options and score range
Parenting Stress Index (PSI) , Abidin (1982) [28], Abidin (1995) [29]	4 (PSI-101)	Measure the relative stress in the parent-child relationship. Target population: parents of children age 1 month to 12 years, primary pre-schoolers.	ns	6 (101)	1–5; 101–505
	1 (PSI-123)		ns	ns (123)	1–5; 123–615
	1 (PSI-25)		ns	ns (25)	1–5; ns
	PSI Short Form (PSI-SF), Abidin (2011) [30]		Past week	3 (36)	1–5; 36–180
Perceived Stress Scale , Cohen (1983) [31], Cohen (1994) [32], Cohen et.al. (2011) [33]	6 (PSS-14)	Measure degree to which individuals appraise situations in their lives as unpredictable, uncontrollable, and overloading. Target population: general population.	Last month	ns (10)	0–4; 0–56
	9 (PSS-10)			(14)	0–4; 0–40
	1 (PSS-4)			(4)	0–4; 0–16
Hung Postpartum Stress Scale (HPSS) , Hung (2005) [34], Hung (2001) [35]	1 (HPSS-42)	Measure stress in postpartum women. Target population: postpartum women.	During the pureperium	3 (42)	1–5; 42–210
	1 (HPSS-59)			ns (59)	ns
	1 (HPSS-62)			ns (62)	1–5; 62–310
	5 (HPSS-61)			ns (61)	1–5; 61–305
Parenting Stress Scale (PSS) , Berry and Jones (1995) [36]	4 (PSS-18)	Developed to capture individual levels of stress associated with raising children. Target population: parents.	The parental period	Unidimensional (18)	1–5; 18–90
	1 (PSS-17)			(17)	
	1 (PSS-12)			(12)	
	1 (PSS-10)			(10)	
Depression Anxiety Stress Scale (DASS) , Lovibond and Lovibond (1995) [37]	3 (DASS-21)	Measure and distinguish between depression and anxiety, and stress. Target population: general population.	ns	3 (21)	0–3; 0–63
	1 (DASS-42)		Past week	3 (42)	0–3; 0–126
Childcare Stress Inventory , Cutrona 1983 [38]	1	Measure stressful postpartum events of parenthood, specifically related to childcare. Target population: not specified.	Postpartum period	ns (20)	0–100; 0–2000

(Continued)

Table 2. (Continued)

Name of instrument, author (year of development)	Used by how many studies (items-version)	Construct and target population	Recall period	(Sub) scale (s)/ domain (number of items)	Response options and score range
Postpartum Childcare Stress Checklist , Dennis et.al. (2018) [39]	1	Measure parental perceptions of postpartum childcare stress. Update of CSI [25]. Target population: mothers in early postpartum period.	Early in the postpartum period	ns (19)	ns; 0–23
Postnatal Perceived Stress Inventory , Razurel et.al (2013) [40]	2	Evaluate interventions for perceived stress during the post-natal period. Target population: mothers.	Postnatal period	6 (27)	1–5; 27–135
Post-delivery perceived stress inventory , Razurel et.al. (2014) [41]	1	Measure post-delivery perceived stress among primiparous women. Target population: primiparous mothers.	From delivery and forward	6 (29)	1–5; 29–145
Cognitive Appraisal of Parenting as Stressful , Folkman and Lazarus (1985) [42]	1	Measure the degree to which parents experienced parenthood, parenting daily hassles, and parenting-related experiences as stressful. Target population: parents.	ns	ns (11)	1–6; 11–66
Postpartum Stressors Scale , Park et.al. (2015) [43]	1	Assessment of the type and magnitude of stressors during postpartum period. Target population: postpartum women	Postpartum period	ns (9)	1–4; 9–36
Psychosocial Hassles Scale , Misra et.al. (2001) [44]	1	Measure perceived maternal stress due to common stressors. Target population: mothers	Last month	ns (11)	“no stress” to “severe stress”; ns
Rearing-Related Stress , Sato et.al. (1994) [45]	1	Measure mothers’ difficulties concerning stress related to child-rearing, conceptualized as a rearing-related stress. Target population: mothers.	ns	2 (10)	1–4; 10–40
Social Readjustments Rating Scale , Holmes and Rahe (1967) [46]. Also known as the Holmes and Rahe Stress Scale	1	Measure external stressors. Target population: general population.	Last 12 months	ns (39) (originally 43)	Dichotomous; ns
Stress Appraisal Measure , Peacock (1990) [47]	1	Measure an individual’s appraisal of a specific stress situation identified by the examiner. Target population: general population.	ns	7 (28)	1–5; 28–140

Note: Table based on COSMIN standard [21]. ns = not stated.

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Stress Scale (DASS), Hung Postpartum Stress Scale (HPSS), and Parenting Stress Scale (PSS). First, the PSI [28,29] is originally a 101-items instrument, with an optional 19-item Life Stress scale. We included four studies, but no validation studies, of the original PSI 101-items version conducted on parents with healthy children between 0–12 months [38,48–50]. They found Cronbach’s alpha ranging between 0.70–0.94. Two studies used respectively a 25-items version [51] and a 123-items version [17]. The 25-items version is claimed to be based on the original 101-item [51], but it is unclear which items constitute this version. In the 123-items version, the optional Life Stress dimension consists of 22-items [17]. PSI also exists with a widely used 36-item short version [29]. We included one validation study of PSI-Short Form (PSI-SF) [62], and 11 other studies used this version. Cronbach’s alpha in these studies ranged between 0.77–0.96. The extensively used Perceived SS [31] is originally a 14-items instrument, with seven positive- and seven negative items. Later, a 10-items version was introduced, and we included one validation study of Perceived SS-10 [71], with a Cronbach’s alpha for postpartum women of 0.71. There also exists a short 4-items version that can be made from questions 2, 4, 5 and 10 of the Perceived SS-10 version [101]. One study in this sample used the 4-items version [102]. DASS [37] exists primarily with 42 items. DASS consists of three individual scales (depression,

anxiety, stress) and each of the three DASS scales contains 14 items, which are divided into subscales of 2–5 items with similar content. A short version of DASS with 21 items also exists, with three scales that each consists of 7 items. Further, in this scoping review we found several versions of HPSS, presented by the same author group. Different item-versions are validated and adjusted in accordance with new developments. Versions vary from 42–62 items [34,35,80,82]. PSS [36] was originally developed as an 18-items scale, but three validation studies conducted on our parent group of interest recommend exclusion of one or more items [85,86,88]. Thus, among our included studies we find PSS with 18, 17, 12, and 10 items. Lastly, we mention that regarding the Psychosocial Hassles Scale [44], Kinsey, Baptiste-Roberts [97] write that they modified several items to be more appropriate for the study population and added an item, resulting in 12 items. They provide no further explanations.

Only six studies [57–59,90,93,98], using respectively DASS, PSI-SF, and Rearing-Related Stress, had a cut-off to indicate threshold of high-level stress. No other studies made any statements regarding cut-off, beyond some stating that ‘higher score indicates higher perception of parenting stress’.

Reported psychometric properties of included instruments

An overview of the psychometric properties for the 15 instruments is presented in Table 3 with references to all included studies. Among the 64 studies describing the 15 instruments, there were 11 validation studies (see Table 3). These 11 studies validated only seven of the 15 instruments found in relation to the targeted group for this scoping review, including one generic stress measure (Perceived Stress Scale). Hence, eight instruments were used, despite not being validated for use, on parents within the postpartum period.

None of the eleven validation studies presented on all ten psychometric properties according to COSMIN. We found no studies that assessed measurement error, responsiveness or interpretability (these properties are therefore not shown in Table 3). The instrument with the highest number of reported psychometric properties was PSS [36]. Information about internal consistency was provided by all 64 studies, except four. These four studies provided the reliability coefficient or content validity. Internal consistency was reported as Cronbach’s alpha (α), except for one study that reported McDonald’s omega (Ω). Twelve studies reported on construct validity. Five studies assessed criterion validity. Four studies contained information on content validity, using either a group of experts or a working group of patients (face validity). Structural validity was assessed mainly by exploratory or confirmatory factor analysis. Rasch analysis was less common and used only once.

Discussion

This systematic scoping review had two aims: to provide an overview of available instruments on parental stress throughout the postpartum period, and to report psychometric properties measured related to the relevant population. We included and extracted data from 64 studies reporting on 15 instruments used to assess stress among parents with healthy children 0–12 months.

As per our first objective, we identified four generic and eleven parental-specific self-administered instruments used to assess parental stress among parents with children who were 12 months or younger. There is a visible increase in studies measuring parental stress from 2010 and forward, indicating an increased focus on parental stress as an important factor regarding the well-being of families in addition to already established factors like postpartum depression symptoms. This is in line with the increase also found in other studies [5]. Yet, this increase is geographically skewed, with scant research conducted in South America, Africa,

Table 3. Overview of psychometric properties for instruments presented.

Instruments	Authors (Year)	Psychometric properties							
		Reliability		Validity				Criterion validity	
		A	B	Content validity		Construct validity			
				D	E	F	G	H	
Parenting Stress Index (PSI)	Glavin, Smith [17], Gameiro [48], Fredriksen [49], Colpin [50], Anhalt [51]	✓							
	Krieg [52]		✓						
Parenting Stress Index—Short Form (PSI-SF)	Lutenbacher [53]		✓						
	Alves, Milek [54]; Canzi [55]; Goodman [56]; McCarter [12], Guo [57] Prino [58], Vismara [59], Molgora [60], Rollè [61]	✓							
	*Aracena [62]	✓				✓	✓	✓	✓
	Vanska [63]	✓	✓						
Perceived Stress Scale (Perceived SS)									
Perceived SS-10	Walker [16], Gao [64], Gill and Loh [65], Ko [66], Koletzko [67], Lee [68], Mao [69]	✓							
	Mann [70]	✓	✓						
	*Chaaya [71]	✓					✓	✓	✓
Perceived SS-14	Roman [14], Duran [72], Lu [73], Ramirez [74], Tavares [75], Thorp [76]	✓							
Perceived SS-4	Rodriguez [77]	✓							
Hung Postpartum Stress Scale (HPSS)	Fang and Hung [78]	✓							
	Hsien [79]	✓							
	*Hung [80]	✓				✓			
	Lee and Hung [81]	✓							
	*Hung [35]	✓				✓	✓		
	*Hung [34]	✓		✓		✓	✓		
	Hung and Chung [82]	✓					✓		
	Navidian [13]	✓							
Parenting Stress Scale (PSS)									
PSS-18	Da Costa [83], Unternaehrer [84]	✓							
	*Nærde and Sommer Hukkelberg [85]	✓	✓			✓	✓		✓
	*Pontoppidan [86]		✓	✓		✓	✓	✓	
PSS-17	Oltra-Benavent [87]	✓							
PSS-12	*Ornoz [88]	✓				✓		✓	✓
PSS-10	Fernandes [89]	✓							
Depression Anxiety Stress Scale (DASS)									
DASS-21	Wilson [90], Giallo [91], Schwab-Reese [92]	✓							
DASS-42	Gillis [93]	✓							
Childcare Stress Inventory (CSI)/ Postpartum Childcare Stress Checklist	Nurbaeti [94]	✓							
	*Dennis [39]	✓		✓		✓	✓		
Postnatal Perceived Stress Inventory	*Razurel [40]	✓					✓		
	Tabrizi and Nournezhad [95]			✓					
Post-delivery perceived stress inventory	*Razurel [41]	✓					✓		
Cognitive Appraisal of Parenting as Stressful	Levy-Shiff [96]	✓							
Postpartum Stressors Scale	Park [43]	✓							
Psychosocial Hassles Scale	Kinsey [97]	✓							

(Continued)

Table 3. (Continued)

Instruments	Authors (Year)	Psychometric properties					
		Reliability		Validity			
				Content validity	Construct validity	Criterion validity	
Rearing-Related Stress	Cheng [98]	✓					
Social Readjustments Rating Scale	Ngai and Chan [99]	✓					
Stress Appraisal Measure	Honey [100]	✓					

COSMIN psychometric property boxes: A = internal consistency, B = reliability, D = content validity, E = structural validity, F = hypotheses testing, G = cross-cultural validity, H = criterion validity. C = measurement error, I = responsiveness and J = interpretability was removed due to lack of measurement.

*Validation study.

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and the Middle East. Only eight percent of the studies were from these regions. This is disconcerting, given the importance of instruments' cross-cultural validity. Related, acknowledging the differences in mothers' and fathers' postpartum stress symptoms, there is a gap in knowledge about measures for fathers' postpartum stress [63,85,86]. The majority of the included studies focused on mothers (70%), while only two (3%) focused solely on fathers [63,83]. Only two of the 11 validation studies included both fathers and mothers [85,88], both validating the Parental Stress Scale [36]. Together, the two validation studies provide psychometric data on internal consistency, reliability, structural validity, hypotheses testing, cross-cultural validity, and criterion validity. While future studies may usefully build upon this work, there remains an uncertainty regarding the instruments' sensitivity to identify fathers' stress level. When selecting the most appropriate instrument for a particular purpose, it is relevant to compare the conceptual and psychometric properties of the pre-existing instruments [103], and take this information into consideration when making the selection [104]. Our scoping review reveals that those interested in assessing parental stress during the postpartum period among parents, and particularly among fathers, outside of North-America, Europe and a few Asian countries have insufficient information to make an evidence-informed decision on which instrument to use.

We found that the majority of the included studies measured parental stress between 0–6 months after birth. Furthermore, seven of the 11 validation studies assessed parental stress as early as the first two months postpartum [34,35,39–41,62,80], while the remaining four studies assessed parental stress when the child was between 6–12 months [71,85,86,88]. Although the earliest postpartum months give a unique opportunity to measure parental stress given parents' frequent contact with their public health nurse, we must be cognizant that the dynamics related to parenting stress change across the first year after birth [9,59,82]. More studies should validate parental stress instruments throughout the first year after birth, as there is limited information on instruments' properties from especially months 3–12, and it would be important to gain more empirical data on the accuracy of instruments throughout the whole first year of transformation to parenthood.

For five instruments, we identified different item versions. In some studies, a rationale for the selected version was missing, as well as which items had been deselected or added. We encourage future researchers to be more transparent in their reporting. We also found a substantial difference in the number of scale items, from 4 items to 123 items. Clearly, the labour intensity for participants will be dramatically different depending on which scale is used, but given the sparse data provided on the instruments' properties the value of this aspect is presently unclear. In addition, only six studies indicated a cut-off score to divide high-level stress

from lower. This is problematic, because proper interpretation of scores is imperative and best facilitated when the instrument developers establish cut-points for classification purposes [105]. Both the difference in number of items and the lack of cut-off score may cause difficulties in selecting instruments, interpreting scores, and comparing results across studies. The most frequently used instrument in this review was a generic instrument, the Perceived Stress Scale, which is said to be the most widely used instrument for measuring the perception of stress [32]. However, we found that only the Arabic version is validated for parents with young children [71]. Although this instrument may measure the burden of stress among parents, it may lack sensitivity in identifying parent-specific problems and can provide misleading results. In addition, using an instrument that is parent-specific may be more effective in identifying parent-related symptoms and problems, and their impacts on the parent-child dyad.

As per our second objective, we documented that for none of the instruments is there information on all their measurement properties as per the COSMIN criteria. Unsurprisingly, the 11 validation studies presented most of the psychometric information about the instruments. Beyond internal consistency, which was the only information provided by 73.4% of the 64 included studies, we only learn of the psychometric properties of seven of the 15 instruments, and there is no information about measurement error, responsiveness, interpretability. Responsiveness is measured to detect changes over time properly. When unmeasured, researchers and healthcare professionals are poorly equipped to use the instrument as an indicator of quality of care in clinical practice and research. Similarly, interpretability is a meaningful requisite for the applicability of instruments in research [106], but also the evidence on interpretability of all 15 instruments is unknown. The instruments with the most comprehensive psychometric assessments are the Parenting Stress Scale, Parenting Stress Index Short Form, and Hung Postpartum Stress Scale, although the latter is assessed only among parents in Asia. For these three, it would be possible to conduct a systematic review including methodological quality assessment of included validation studies, in accordance with the COSMIN guidelines. Researchers interested in measuring parental stress may wish to examine these instruments in particular to select an appropriate stress measure fit for their purpose. Our results mirror those of Holly and colleagues [7], who found a variety of psychometrics across instruments for parenting stress. They concluded that one must consider both the purpose for which the instrument will be used, and the evidence base for the measure when selecting an instrument, as the importance of psychometric categories may vary depending on the purpose of the parenting stress assessment. It is important to stress that we assessed the extent to which the measurement properties of instruments for parental stress have been evaluated, finding that few to none have been thoroughly evaluated. Thus, we find that there is still insufficient evidence to endorse one specific instrument for parental stress measurement.

Strengths and limitations

The strengths of our scoping review include the systematic searches, selection, and data extraction by two reviewers, and quality assured collation of data. However, in line with scoping review methodology, we conducted no methodological quality assessment of included studies. We also limited the number of languages and had no extensive searches in grey literature sources. Lastly, psychometric properties are reported, not evaluated, which would be important in future research.

Conclusion

There are presently 15 instruments with some associated psychometric information being used to measure parental stress among parents with young children, but the amount of

information on the instruments' psychometric properties is slight. While internal consistency is known for all 15 scales, their validity, responsiveness, and interpretability are mostly unknown. We find that there is still insufficient data to recommend one parental stress instrument over another, and further research is warranted. The lack of evidence of the accuracy of parenting stress measures makes it challenging to understand and mitigate information bias related to parenting stress, and there is a need for further research on the instruments' measurement properties, in different cultural and language contexts, particularly among fathers.

Supporting information

S1 Table. PRISMA-ScR.
(DOCX)

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References

1. Razurel C, Bruchon-Schweitzer M, Dupanloup A, Irion O, Epiney M. Stressful events, social support and coping strategies of primiparous women during the postpartum period: a qualitative study. *Midwifery*. 2011; 27(2):237–42. <https://doi.org/10.1016/j.midw.2009.06.005> PMID: 19783333
2. Deater-Deckard K. Parenting Stress and Child Adjustment: Some Old Hypotheses and New Questions. *Clinical Psychology: Science and Practice*. 1998; 5(3):314–32.
3. Deater-Deckard K. Parenting Stress Among Dual-Earner Mothers and Fathers: Are There Gender Differences? *Journal of Family Psychology*. 1996; 10(1):45–59.
4. Crnic KA, Greenberg MT. Minor Parenting Stresses with Young Children. *Child Development*. 1990; 61(5):1628–37. <https://doi.org/10.1111/j.1467-8624.1990.tb02889.x> PMID: 2245752
5. Louie AD, Cromer LD, Berry JO. Assessing Parenting Stress: Review of the Use and Interpretation of the Parental Stress Scale. *The Family Journal*. 2017; 25(4):359–67.
6. Edelstein H, Schippke J, Sheffe S, Kingsnorth S. Children with medical complexity: a scoping review of interventions to support caregiver stress. *Child: care, health and development*. 2017; 43(3):323–33. <https://doi.org/10.1111/cch.12430> PMID: 27896838

7. Holly LE, Fenley AR, Kritikos TK, Merson RA, Abidin RR, Langer DA. Evidence-Base Update for Parenting Stress Measures in Clinical Samples. *Journal of Clinical Child & Adolescent Psychology*. 2019; 48(5):685–705. <https://doi.org/10.1080/15374416.2019.1639515> PMID: 31393178
8. Hart S, Schwartz R. *Fra interaksjon til relasjon: tilknytning hos Winnicott, Bowlby, Stern, Schore og Fonagy*. Oslo: Gyldendal Akademiske 2009. 285 p.
9. Mercer RT. Becoming a Mother Versus Maternal Role Attainment. *Journal of Nursing Scholarship*. 2004; 36(3):226–32. <https://doi.org/10.1111/j.1547-5069.2004.04042.x> PMID: 15495491
10. Ostberg M, Hagekull B. A structural modeling approach to the understanding of parenting stress. *Journal of clinical child psychology*. 2000; 29(4):615–25. https://doi.org/10.1207/S15374424JCCP2904_13 PMID: 11126638
11. Abidin RR. The Determinants of Parenting Behavior. *Journal of clinical child psychology*. 1992; 21(4):407–12.
12. McCarter DE, Demidenko E, Sisco TS, Hegel MT. Technology-assisted nursing for postpartum support: A randomized controlled trial. *Journal of advanced nursing*. 2019; 75(10):2223–35. <https://doi.org/10.1111/jan.14114> PMID: 31222789
13. Navidian A, Sarasiyabi AS, Koochakzai M. The Effect of Home-Based Supportive-Educational Counseling on Primigravidas' Postpartum Stress. *International Journal of Womens Health and Reproduction Sciences*. 2017; 5(2):112–8.
14. Roman LA, Gardiner JC, Lindsay JK, Moore JS, Luo Z, Baer LJ, et al. Alleviating perinatal depressive symptoms and stress: a nurse-community health worker randomized trial. *Archives of women's mental health*. 2009; 12(6):379–91. <https://doi.org/10.1007/s00737-009-0083-4> PMID: 19551471
15. Hartley E, Hill B, Bailey C, Fuller-Tyszkiewicz M, Skouteris H. The associations of weight status and body attitudes with depressive and anxiety symptoms across the first year postpartum. *Women's Health Issues*. 2018; 28(6):530–8. <https://doi.org/10.1016/j.whi.2018.07.002> PMID: 30139521
16. Walker LO, Kang S, Sterling BS. Weight-Loss Resilience Among Low-Income Postpartum Women: Association With Health Habits. *Western Journal of Nursing Research*. 2019; 41(12):1709–23. <https://doi.org/10.1177/0193945918824598> PMID: 30658560
17. Glavin K, Smith L, Sorum R, Ellefsen B. Redesigned community postpartum care to prevent and treat postpartum depression in women—a one-year follow-up study. *J Clin Nurs*. 2010; 19(21–22):3051–62. <https://doi.org/10.1111/j.1365-2702.2010.03332.x> PMID: 20726926
18. Levac D, Colquhoun H, O'Brien K. Scoping Studies: Advancing the Methodology. *Implementation science: IS*. 2010; 5:69. <https://doi.org/10.1186/1748-5908-5-69> PMID: 20854677
19. Arksey H O'Malley L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*. 2005; 8(1):19–32.
20. Øygarden AU. PROTOCOL: Measurement instruments for parental stress: A SCOPING REVIEW. 2020. URL: https://www.researchgate.net/publication/351664237_PROTOCOL_Measurement_instruments_for_parental_stress_A_SCOPING_REVIEW.
21. Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, et al. The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. *Journal of clinical epidemiology*. 2010; 63(7):737–45. <https://doi.org/10.1016/j.jclinepi.2010.02.006> PMID: 20494804
22. Kelley AS, Bollens-Lund E. Identifying the Population with Serious Illness: The "Denominator" Challenge. *Journal of palliative medicine*. 2018; 21(S2):S7–s16. <https://doi.org/10.1089/jpm.2017.0548> PMID: 29125784
23. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan—a web and mobile app for systematic reviews. *Systematic Reviews*. 2016; 5. <https://doi.org/10.1186/s13643-016-0384-4> PMID: 27919275
24. Peters M, Godfrey C, Khalil H, McInerney P, Parker D, Soares C. Guidance for conducting systematic scoping reviews. *International journal of evidence-based healthcare*. 2015; 13. <https://doi.org/10.1097/XEB.000000000000050> PMID: 26134548
25. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Annals of Internal Medicine*. 2018; 169(7):467–73. <https://doi.org/10.7326/M18-0850> PMID: 30178033
26. Moher D, Liberati A., Tetzlaff J., D.G. A. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Medicine*. 2009; 6(6).
27. Fox MP, Lash TL, Bodnar LM. Common misconceptions about validation studies. *International Journal of Epidemiology*. 2020; 49(4):1392–6. <https://doi.org/10.1093/ije/dyaa090> PMID: 32617564
28. Abidin RR. Parenting Stress and the Utilization of Pediatric Services. *Children's Health Care*. 1982; 11(2):70–3.

29. Abidin RR. Parenting Stress Index. Professional Manual. (3 ed.). Odessa, FL: Psychological Assessment Resources; 1995.
30. Abidin RR, Christie J, Bunting B. Parenting Stress Index. The effect of health visitors' postpartum home visit frequency on first-time mothers: Cluster randomised trial. 2011; 48:689–702. <https://doi.org/10.1002/aur.213> PMID: 21882359
31. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *Journal of Health and Social Behavior*. 1983; 24(4):385–96. PMID: 6668417
32. Cohen S. PERCEIVED STRESS SCALE. Mind Garden; 1994.
33. Cohen S, Christie J, Bunting B. Perceived Stress Scale—14. The effect of health visitors' postpartum home visit frequency on first-time mothers: Cluster randomised trial. 2011; 48:689–702.
34. Hung CH. Measuring postpartum stress. *Journal of Advanced Nursing*. 2005; 50(4):417–24. <https://doi.org/10.1111/j.1365-2648.2005.03407.x> PMID: 15842449
35. Hung CH. Validity and reliability testing of the Hung Postpartum Stress Scale. *Kaohsiung J Med Sci*. 2001; 17:423–9. PMID: 11715842
36. Berry JO, Jones WH. The Parental Stress Scale: Initial Psychometric Evidence. *Journal of Social and Personal Relationships*. 1995; 12(3):463–72.
37. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behav Res Ther*. 1995; 33(3):335–43. [https://doi.org/10.1016/0005-7967\(94\)00075-u](https://doi.org/10.1016/0005-7967(94)00075-u) PMID: 7726811
38. Cutrona CE. Causal attributions and perinatal depression. *Journal of Abnormal Psychology*. 1983; 92(2):161–72. <https://doi.org/10.1037//0021-843x.92.2.161> PMID: 6863731
39. Dennis CL, Brown HK, Brennenstuhl S. Development, Psychometric Assessment, and Predictive Validity of the Postpartum Childcare Stress Checklist. *Nursing research*. 2018; 67(6):439–46. <https://doi.org/10.1097/NNR.0000000000000308> PMID: 30067584
40. Razurel C, Kaiser B, Dupuis M, Antonietti J-P, Sellenet C, Epiney M. Validation of the postnatal perceived stress inventory in a French speaking population of primiparous women. *Journal of obstetric, gynecologic, and neonatal nursing: JOGNN*. 2013; 42(6):685–96. <https://doi.org/10.1111/1552-6909.12251> PMID: 24128144
41. Razurel C, Kaiser B, Dupuis M, Antonietti J-P, Sellenet C, Epiney M. Validation of the post-delivery perceived stress inventory. *Psychology, Health & Medicine*. 2014; 19(1):70–82. <https://doi.org/10.1080/13548506.2013.774431> PMID: 23477659
42. Folkman S, Lazarus RS. If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology*. 1985; 48(1):150–70. <https://doi.org/10.1037//0022-3514.48.1.150> PMID: 2980281
43. Park JH, Karmaus W, Zhang HM. Prevalence of and Risk Factors for Depressive Symptoms in Korean Women throughout Pregnancy and in Postpartum Period. *Asian Nursing Research*. 2015; 9(3):219–25. <https://doi.org/10.1016/j.anr.2015.03.004> PMID: 26412626
44. Misra DP, O'Campo P, Strobino D. Testing a sociomedical model for preterm delivery. *Paediatric and Perinatal Epidemiology*. 2001; 15(2):110–22. <https://doi.org/10.1046/j.1365-3016.2001.00333.x> PMID: 11383575
45. Sato T, Sugawara M, Toda M, Shima S, Kitamura T. [Rearing related stress and depressive severity]. *Shinrigaku kenkyu: The Japanese journal of psychology*. 1994; 64(6):409–16. <https://doi.org/10.4992/jjpsy.64.409> PMID: 8201806
46. Holmes TH, Rahe RH. The social readjustment rating scale. *Journal of Psychosomatic Research*. 1967; 11(2):213–8. [https://doi.org/10.1016/0022-3999\(67\)90010-4](https://doi.org/10.1016/0022-3999(67)90010-4) PMID: 6059863
47. Peacock EJ, Wong PT. The Stress Appraisal Measure (SAM): A multidimensional approach to cognitive appraisal. *Stress Medicine*. 1990; 6(3):227–36.
48. Gameiro S, Moura-Ramos M, Canavarro MC, Soares I. Psychosocial Adjustment During the Transition to Parenthood of Portuguese Couples Who Conceived Spontaneously or Through Assisted Reproductive Technologies. *Research in Nursing & Health*. 2010; 33(3):207–20.
49. Fredriksen E, von Soest T, Smith L, Moe V. Parenting Stress Plays a Mediating Role in the Prediction of Early Child Development from Both Parents' Perinatal Depressive Symptoms. *Journal of Abnormal Child Psychology*. 2019; 47(1):149–64. <https://doi.org/10.1007/s10802-018-0428-4> PMID: 29623542
50. Colpin H, De Munter A, Nys K, Vandemeulebroecke L. Pre- and postnatal determinants of parenting stress in mothers of one-year-old twins. *Special Issue: Macro/micro dynamics and the family*. 2000; 30(1–2):99–107.

51. Anhalt K, Telzrow CF, Brown CL. Maternal stress and emotional status during the perinatal period and childhood adjustment. *Special Issue: Perinatal Exposure in Later Psychological and Behavioral Disabilities*. 2007; 22(1):74–90.
52. Krieg DB. Does motherhood get easier the second-time around? Examining parenting stress and marital quality among mothers having their first or second child. *Parenting: Science and Practice*. 2007; 7(2):149–75.
53. Lutenbacher M, Elkins T, Dietrich MS, Riggs A. The Efficacy of Using Peer Mentors to Improve Maternal and Infant Health Outcomes in Hispanic Families: Findings from a Randomized Clinical Trial. *Maternal and child health journal*. 2018; 22(Suppl 1):92–104. <https://doi.org/10.1007/s10995-018-2532-z> PMID: 29855840
54. Alves S, Milek A, Bodenmann G, Fonseca A, Canavarro MC, Pereira M. Romantic attachment, dyadic coping, and parental adjustment across the transition to parenthood. *Personal Relationships*. 2019; 26(2):286–309.
55. Canzi E, Molgora S, Fenaroli V, Rosnati R, Saita E, Ranieri S. "Your Stress Is My Stress": A Dyadic Study on Adoptive and Biological First-Time Parents. *Couple and Family Psychology-Research and Practice*. 2019; 8(4):197–207.
56. Goodman SH, Broth MR, Hall CM, Stowe ZN. Treatment of postpartum depression in mothers: Secondary benefits to the infants. *Special Issue: Perinatal mood and anxiety disorders and mother-infant relationships*. 2008; 29(5):492–513. <https://doi.org/10.1002/imhj.20188> PMID: 28636221
57. Guo N, Bindt C, Te Bonle M, Appiah-Poku J, Tomori C, Hinz R, et al. Mental health related determinants of parenting stress among urban mothers of young children—results from a birth-cohort study in Ghana and Cote d'Ivoire. *BMC psychiatry*. 2014; 14:156. <https://doi.org/10.1186/1471-244X-14-156> PMID: 24884986
58. Prino LE, Rolle L, Sechi C, Patteri L, Ambrosoli A, Caldarrera AM, et al. Parental relationship with twins from pregnancy to 3 months: The relation among parenting stress, infant temperament, and well-being. *Frontiers in Psychology*. 2016; 7.
59. Vismara L, Rolle L, Agostini F, Sechi C, Fenaroli V, Molgora S, et al. Perinatal Parenting Stress, Anxiety, and Depression Outcomes in First-Time Mothers and Fathers: A 3-to 6-Months Postpartum Follow-Up Study. *Frontiers in Psychology*. 2016; 7.
60. Molgora S, Fenaroli V, Saita E. The association between childbirth experience and mother's parenting stress: The mediating role of anxiety and depressive symptoms. *Women & Health*. 2020; 60(3):341–51. <https://doi.org/10.1080/03630242.2019.1635563> PMID: 31264529
61. Rollè L, Prino LE, Sechi C, Vismara L, Neri E, Polizzi C, et al. Parenting Stress, Mental Health, Dyadic Adjustment: A Structural Equation Model. *Front Psychol*. 2017; 8:839. <https://doi.org/10.3389/fpsyg.2017.00839> PMID: 28588541
62. Aracena M, Gómez E, Undurraga C, Leiva L, Marinkovic K, Molina Y. Validity and reliability of the parenting stress index short form (PSI-SF) applied to a Chilean sample. *Journal of Child and Family Studies*. 2016; 25(12):3554–64.
63. Vanska M, Punamaki RL, Tolvanen A, Lindblom J, Flykt M, Unkila-Kallio L, et al. Paternal mental health trajectory classes and early fathering experiences: Prospective study on a normative and formerly infertile sample. *International Journal of Behavioral Development*. 2017; 41(5):570–80.
64. Gao LL, Chan SWC, Mao Q. Depression, Perceived Stress, and Social Support Among First-Time Chinese Mothers and Fathers in the Postpartum Period. *Research in Nursing & Health*. 2009; 32(1):50–8.
65. Gill RM, Loh J. The Role of Optimism in Health-Promoting Behaviors in New Primiparous Mothers. *Nursing research*. 2010; 59(5):348–55. <https://doi.org/10.1097/NNR.0b013e3181ed6b11> PMID: 20697308
66. Ko SH, Chen CH, Wang HH, Su YT. Postpartum Women's Sleep Quality and Its Predictors in Taiwan. *Journal of Nursing Scholarship*. 2014; 46(2):74–81. <https://doi.org/10.1111/jnu.12053> PMID: 24118749
67. Koletzko SH, La Marca-Ghaemmaghami P, Brandstatter V. Mixed Expectations: Effects of Goal Ambivalence during Pregnancy on Maternal Well-Being, Stress, and Coping. *Applied Psychology-Health and Well Being*. 2015; 7(3):249–74. <https://doi.org/10.1111/aphw.12047> PMID: 26099234
68. Lee SH, Liu LC, Kuo PC, Lee MS. Postpartum Depression and Correlated Factors in Women Who Received In Vitro Fertilization Treatment. *Journal of Midwifery & Womens Health*. 2011; 56(4):347–52. <https://doi.org/10.1111/j.1542-2011.2011.00033.x> PMID: 21733105
69. Mao Q, Zhu LX, Su XY. A comparison of postnatal depression and related factors between Chinese new mothers and fathers. *Journal of Clinical Nursing*. 2011; 20(5):645–52.

70. Mann JR, Mannan J, Quinones LA, Palmer AA, Torres M. Religion, Spirituality, Social Support, and Perceived Stress in Pregnant and Postpartum Hispanic Women. *Jognn-Journal of Obstetric Gynecologic and Neonatal Nursing*. 2010; 39(6):645–57.
71. Chaaya M, Osman H, Naassan G, Mahfoud Z. Validation of the Arabic version of the Cohen Perceived Stress Scale (PSS-10) among pregnant and postpartum women. *BMC Psychiatry*. 2010; 10. <https://doi.org/10.1186/1471-244X-10-111> PMID: 21159169
72. Duran S, Kaynak S, Karadas A. The relationship between breastfeeding attitudes and perceived stress levels of Turkish mothers. *Scandinavian journal of caring sciences*. <https://doi.org/10.1111/scs.12749> PMID: 31487080
73. Lu H, Zhu X, Hou R, Wang DH, Zhang HJ, While A. Chinese family adaptation during the postpartum period and its influencing factors: A questionnaire survey. *Midwifery*. 2012; 28(2):222–7. <https://doi.org/10.1016/j.midw.2011.01.004> PMID: 21419534
74. Ramirez FP, Garcia-Garcia I, Peralta-Ramirez MI. The Migration Process as a Stress Factor in Pregnant Immigrant Women in Spain. *Journal of Transcultural Nursing*. 2013; 24(4):348–54. <https://doi.org/10.1177/1043659613493328> PMID: 23883564
75. Tavares IM, Schlagintweit HE, Nobre PJ, Rosen NO. Sexual well-being and perceived stress in couples transitioning to parenthood: A dyadic analysis. *International Journal of Clinical and Health Psychology*. 2019; 19(3):198–208. <https://doi.org/10.1016/j.ijchp.2019.07.004> PMID: 31516498
76. Thorp SR, Krause ED, Cukrowicz KC, Lynch TR. Postpartum partner support, demand withdraw communication, and maternal stress. *Psychology of Women Quarterly*. 2004; 28(4):362–9.
77. Rodriguez ACI, Schetter CD, Brewis A, Tomiyama AJ. The psychological burden of baby weight: Pregnancy, weight stigma, and maternal health. *Social Science & Medicine*. 2019;235.
78. Fang L, Hung C-H. Couples' postpartum health status. *Journal of Clinical Nursing*. 2012; 21(17–18):2538–44. <https://doi.org/10.1111/j.1365-2702.2012.04104.x> PMID: 22889447
79. Hsien CF, Fu JC, Long CY, Lin HS. Factors Influencing Breast Symptoms in Breastfeeding Women After Cesarean Section Delivery. *Asian Nursing Research*. 2011; 5(2):88–98. [https://doi.org/10.1016/S1976-1317\(11\)60017-0](https://doi.org/10.1016/S1976-1317(11)60017-0) PMID: 25030258
80. Hung CH. The Hung Postpartum Stress Scale. *Journal of Nursing Scholarship*. 2007; 39(1):71–4. <https://doi.org/10.1111/j.1547-5069.2007.00146.x> PMID: 17393969
81. Lee L-C, Hung C-H. Predictors of post-partum stress in Vietnamese immigrant women in Taiwan. *Japan Journal of Nursing Science*. 2016; 13(1):38–45. <https://doi.org/10.1111/jjns.12084> PMID: 26036337
82. Hung CH, Chung HH. The effects of postpartum stress and social support on postpartum women's health status. *Journal of advanced nursing*. 2001; 36(5):676–84. <https://doi.org/10.1046/j.1365-2648.2001.02032.x> PMID: 11737500
83. Da Costa D, Danieli C, Abrahamowicz M, Dasgupta K, Sewitch M, Lowensteyn I, et al. A prospective study of postnatal depressive symptoms and associated risk factors in first-time fathers. *Journal of Affective Disorders*. 2019; 249:371–7. <https://doi.org/10.1016/j.jad.2019.02.033> PMID: 30818245
84. Unternaehrer E, Cost KT, Jonas W, Dhir SK, Bouvette-Turcot AA, Gaudreau H, et al. Once and Again. *Human Nature-an Interdisciplinary Biosocial Perspective*. 2019; 30(4):448–76.
85. Nærde A, Sommer Hukkelberg S. An examination of validity and reliability of the Parental Stress Scale in a population based sample of Norwegian parents. *PLOS ONE*. 2020; 15(12):e0242735. <https://doi.org/10.1371/journal.pone.0242735> PMID: 33264325
86. Pontoppidan M, Nielsen T, Kristensen IH. Psychometric properties of the Danish Parental Stress Scale: Rasch analysis in a sample of mothers with infants. *PLOS ONE*. 2018; 13(11):e0205662. <https://doi.org/10.1371/journal.pone.0205662> PMID: 30403692
87. Oltra-Benavent P, Cano-Climent A, Oliver-Roig A, Cabrero-Garcia J, Richart-Martinez M. Spanish version of the Parenting Sense of Competence scale: Evidence of reliability and validity. *Child & Family Social Work*. 2020; 25(2):373–83.
88. Oronoz B, Alonso-Arbiol I, Balluerka N. A Spanish adaptation of the Parental Stress Scale. *Psicothema*. 2007; 19(4):687–92. PMID: 17959127
89. Fernandes DV, Canavarro MC, Moreira H. The Mediating Role of Parenting Stress in the Relationship Between Anxious and Depressive Symptomatology, Mothers' Perception of Infant Temperament, and Mindful Parenting During the Postpartum Period. *Mindfulness*.
90. Wilson N, Wynter K, Anderson C, Rajaratnam SMW, Fisher J, Bei B. More than depression: a multi-dimensional assessment of postpartum distress symptoms before and after a residential early parenting program. *Bmc Psychiatry*. 2019; 19.

91. Giallo R, Cooklin A, Dunning M, Seymour M. The efficacy of an intervention for the management of postpartum fatigue. *J Obstet Gynecol Neonatal Nurs*. 2014; 43(5):598–613. <https://doi.org/10.1111/1552-6909.12489> PMID: 25139257
92. Schwab-Reese LM, Schafer EJ, Ashida S. Associations of social support and stress with postpartum maternal mental health symptoms: Main effects, moderation, and mediation. *Women Health*. 2017; 57(6):723–40. <https://doi.org/10.1080/03630242.2016.1181140> PMID: 27104912
93. Gillis A, Gabriel B, Galdiolo S, Roskam I. Partner Support as a Protection Against Distress During the Transition to Parenthood. *Journal of Family Issues*. 2019; 40(9):1107–25.
94. Nurbaeti I, Deoisres W, Hengudomsu P. Postpartum Depression in Indonesian Mothers: Its Changes and Predicting Factors. *Pacific Rim International Journal of Nursing Research*. 2018; 22(2):93–105.
95. Tabrizi FM, Nournezhad H. POSTPARTUM PERCEIVED STRESS IN PRIMIPARA WOMEN REFERRED TO HEALTH CENTERS OF URMIA. *International Journal of Health Medicine and Current Research-Ijhmcr*. 2018; 3(1):759–65.
96. Levy-Shiff R. Fathers' cognitive appraisals, coping strategies, and support resources as correlates of adjustment to parenthood. *Journal of Family Psychology*. 1999; 13(4):554–67.
97. Kinsey CB, Baptiste-Roberts K, Zhu JJ, Kjerulff KH. Birth-related, psychosocial, and emotional correlates of positive maternal-infant bonding in a cohort of first-time mothers. *Midwifery*. 2014; 30(5): E188–E94. <https://doi.org/10.1016/j.midw.2014.02.006> PMID: 24650812
98. Cheng SY, Maeda T, Yamagata Z, Tomiwa K, Yamakawa N, Japan Children's Study G. Comparison of Factors Contributing to Developmental Attainment of Children between 9 and 18 Months. *Journal of Epidemiology*. 2010; 20:S452–S8. <https://doi.org/10.2188/jea.je20090177> PMID: 20179366
99. Ngai F-W, Chan SW-C. Psychosocial factors and maternal wellbeing: An exploratory path analysis. *International Journal of Nursing Studies*. 2011; 48(6):725–31. <https://doi.org/10.1016/j.ijnurstu.2010.11.002> PMID: 21144517
100. Honey KL, Morgan M, Bennett P. A stress-coping transactional model of low mood following childbirth. *Journal of Reproductive and Infant Psychology*. 2003; 21(2):129–43.
101. Cohen S. Perceived stress in a probability sample of the United States. *The social psychology of health. The Claremont Symposium on Applied Social Psychology*. Thousand Oaks, CA, US: Sage Publications, Inc; 1988. p. 31–67.
102. Rodriguez ACI, Tomiyama AJ, Guardino CM, Schetter CD. Association of weight discrimination during pregnancy and postpartum with maternal postpartum health. *Health Psychology*. 2019; 38(3):226–37. <https://doi.org/10.1037/hea0000711> PMID: 30762402
103. Epstein J, Santo RM, Guillemin F. A review of guidelines for cross-cultural adaptation of questionnaires could not bring out a consensus. *Journal of clinical epidemiology*. 2015; 68(4):435–41. <https://doi.org/10.1016/j.jclinepi.2014.11.021> PMID: 25698408
104. Haywood KL, Wilson R, Staniszewska S, Salek S. Using PROMs in Healthcare: Who Should Be in the Driving Seat—Policy Makers, Health Professionals, Methodologists or Patients? *The Patient—Patient-Centered Outcomes Research*. 2016; 9(6):495–8. <https://doi.org/10.1007/s40271-016-0197-5> PMID: 27646693
105. Polit DF, Beck CT. *Nursing Research—Generating and Assessing Evidence for Nursing Practice*. Eleventh edition ed. Philadelphia, US: Wolters Kluwer; 2021. 809 p.
106. Mokkink LB, Prinsen CA, Patrick DL, Alonso J, Bouter LM, de Vet HC, et al. COSMIN methodology for systematic reviews of Patient-Reported Outcome Measures (PROMs). Amsterdam: Amsterdam Public Health researchinstitute, VU University Medical Center; 2018 February 2018. Contract No.: Version 1.0.