

Measuring posttraumatic stress following childbirth: a critical evaluation of instruments

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Abstract

Objectives. To evaluate instruments used to assess posttraumatic stress disorder (PTSD) following childbirth with both quantitative (reliability analysis and factor analysis) and qualitative (comparison of operationalization) techniques.

Methods. An unselected population of 428 women completed the Traumatic Event Scale-B (TES-B) and the PTSD Symptom Scale-Self Report (PSS-SR) 2–6 months after delivery.

Results. Assessment of internal consistency yielded similar results for the TES-B and PSS-SR (Cronbach's $\alpha = 0.87$ and 0.82 , respectively). Factor analysis revealed two rather than three DSM-IV symptom categories for both instruments: childbirth-related factors (re-experiencing/avoidance) and symptoms of depression and anxiety (numbing/hyperarousal). Although the TES-B and the PSS-SR sum-scores show a strong relationship (Spearman's $\rho = 0.78$), agreement between the instruments on the identification of PTSD cases is low ($\kappa = 0.24$); discrepancy between TES-B and PSS-SR is largely due to differences in instruction to respondents, formulation of items, answer categories, and cut-off values.

Conclusions. Large operationalization differences between TES-B and PSS-SR have been identified, i.e., in the formulation of questions, answer categories, cut-off values and instructions to respondents. Comparison between studies using different instruments for measuring PTSD following childbirth should be done with utmost caution.

Keywords: Posttraumatic stress disorder, psychometrics, instruments, operationalization, childbirth, postpartum

Introduction

Posttraumatic stress disorder (PTSD) is an anxiety disorder that may develop following exposure to a traumatic stressor. Table I presents an overview of the criteria for PTSD according to the Diagnostic and Statistical Manual of Mental Diseases (DSM-IV) [1]. In the past decade, awareness has been raised that childbirth may be a possible traumatic event [2,3]. A limited number of studies have reported estimates of the prevalence of posttraumatic stress (disorder) following childbirth, ranging from 0 to

14.9% between 1 and 14 months after childbirth [2–15]. Table II summarizes the most prominent studies on the prevalence of PTSD following childbirth, excluding research focusing on specific patient characteristics (e.g., stillbirth, pregnancy loss, emergency caesarean section). In addition to differences in diagnostic instruments and timing of measurements (ranging from 1 to 14 months after childbirth), the size and composition of study populations differ considerably: some included only low-risk patients [4,9] or women attending childbirth classes [7,14], others excluded patients in which (certain) complications

Table I. DSM-IV diagnostic criteria for PTSD.

A Stressor	1. Trauma involves actual or threatened death/serious injury, or threat to physical integrity of self or other 2. Individual responded with intense fear, helplessness and/or horror
Symptoms	
B Re-experiencing	1. Recurrent and intrusive distressing recollections of the event 2. Recurrent distressing dreams of the event 3. Acting or feeling as if the event were recurring (e.g., flashbacks, hallucinations) 4. Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the event 5. Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the event
C Avoidance and numbing	1. Efforts to avoid thoughts, feelings, or conversations associated with the event 2. Efforts to avoid activities, places, or people that arouse recollections of the event 3. Inability to recall an important aspect of the trauma 4. Diminished interest or participation in significant activities 5. Feeling of detachment or estrangement from others 6. Restricted range of affect 7. Sense of foreshortened future
D Hyperarousal	1. Difficulty falling or staying asleep 2. Irritability or outbursts of anger 3. Difficulty concentrating 4. Hypervigilance 5. Exaggerated startle response
E Duration	One month or longer
F Disability	Symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning

Table II. PTSD measures and DSM-IV criteria used in previous studies.

Study	Sample size	Instrument	DSM-IV criteria	Prevalence of PTSD (%)	Post partum (months)
Wijma et al. [2]	1640	TES-B [2]	A, B, C, D, E, F	1.7	1.0–14.0
Creedy et al. [4]	499	PSS-I [16]	(A) B, C, D*	5.6	1.0–1.5
Czarnocka and Slade [5]	264	PTSD-I(Q) [17]	B, C, D, E	3.0	1.5
Ayers and Pickering [3]	289	PSS-SR [16]	B, C, D, F	3.2 / 2.0	1.5 / 6.0
Skari et al. [6]	127	IES [18] + GHQ-28 [19]	B, C, D	0.0 / 0.8	1.5 / 6.0
Soet et al. [7]	103	TES-B [2]	A, B, C, D	1.9	1.0
Cohen et al. [8]	200	DTS [20]	B, C, D	0.0	2.0–2.5
Olde et al. [9]	140	PSS-SR [16]	A, B, C, D, F	2.1	3.0
Wenzel et al. [10]	147	SCID [21]	A, B, C, D, E, F	0.0	2.0
Adewuya et al. [11]	876	M.I.N.I. [22]	A, B, C, D, E, F	5.9	1.5
Maggioni et al. [12]	93	PTSD-I(Q) [17]	B, C, D	2.4	3.0–6.0
Söderquist et al. [13]	1224	TES-B [2]	B, C, D	3.0	1.0–11.0
Zaers et al. [14]	47	PSS-SR [16]	B, C, D	6.0 / 14.9	1.5 / 6.0
Stramrood et al. [15]	428	TES-B [2]	A, B, C, D, E, F	1.2	2.0–6.0

TES-B, Traumatic Event Scale-B [2]; PSS, PTSD Symptom Scale, SR, self-report, I, interview [16]; PTSD-I(Q), Posttraumatic Stress Disorder Interview (Questionnaire) [17]; IES, Impact of Event Scale [18]; GHQ-28, General Health Questionnaire [19]; SCID-NP, Structured Clinical Interview for DSM-IV Disorders – non-patient version [21]; M.I.N.I., MINI International Neuropsychiatric Interview [22]; DTS, Davidson Trauma Scale [20].

*question about traumatic event was included, but not according to DSM-IV guidelines.

arose [3,5,6,8], while again others did make use of an unselected population [2,11,13,15].

In order to diagnose PTSD following childbirth, several measures are available, some of which have been designed specifically for PTSD following childbirth [2], whereas others are more generic questionnaires that can be used to diagnose PTSD following a variety of traumatic events [16,17,20–22], or broad instruments containing PTSD-related items [18,19]. Until now, few measures have been validated with

clinical interviews and a great variance in reported sensitivity and specificity is observed [16,23].

Most instruments include all the DSM-IV criteria, although some lack (explicit) questions on the duration and severity of symptoms, and in several measures the stressor (childbirth) being traumatic (criterion A) is not included. In- or excluding certain DSM-IV criteria is likely to have substantial implications for PTSD prevalence estimates, and thereby for comparing studies using different instruments.

Researchers and clinicians increasingly acknowledge that significant posttraumatic stress symptoms without qualifying for the diagnosis of PTSD may also be of clinical relevance [24].

We expected that, in addition to the described differences in study design, timing and research populations, differences between questionnaires (items, phrasing, answer categories etc.) might account for the considerable discrepancies in prevalence rates of PTSD following childbirth. It is topic of debate whether screening measures used to identify PTSD in the general population are specific enough to measure PTSD following childbirth [24]. The aim of the present study is to critically evaluate two instruments used for measuring PTSD following childbirth: the Traumatic Event Scale-B (TES-B) [2] and the PTSD Symptom Scale-Self Report (PSS-SR) [16]. The two instruments will be compared on both quantitative and qualitative levels, in order to provide relevant information to establish which of the two is to be preferred for assessing PTSD following childbirth. In the Methods section, the characteristics of the two measures will be described. Subsequently, a quantitative comparison and analysis is carried out, followed by a qualitative comparison and analysis. Finally, recommendations and conclusions are presented.

Methods

Design, setting, and population

In this cross-sectional multi-center study, one academic referral center, two general hospitals, and four midwifery practices in The Netherlands participated. A written request was sent to all 907 women who delivered between July 1st and October 1st, 2007 (i.e., 2–6 months prior to partaking in the study), followed by a reminder to non-responders. All women giving birth after 16 weeks gestation or longer were approached, including those with stillbirths and late pregnancy terminations. Four-hundred twenty-eight women (47%) completed the questionnaires. Table III summarizes the characteristics of the respondents.

Measures

The TES-B [2] and the PSS-SR [16] were administered as part of a larger anonymous web-based questionnaire, in which variables and outcome measures (PTSD) were not explicitly mentioned. A detailed description of the instructions to participants, answer categories, phrasing of items, and cut-off values of each instrument is presented in Table IV.

The TES-B [2] has been developed especially for diagnosing PTSD following childbirth. It includes all DSM-IV criteria for PTSD, but has not yet been

Table III. Sample characteristics.

Factor	N or M (\pm SD)	Percentage or range
<i>Demographics</i>		
Age	32 (\pm 4)	17–45
Education		
Upper level secondary / University	235	54.9
Marital status		
Married / co-habiting	413	96.5
Country of origin		
The Netherlands	398	93.0
<i>Obstetric history</i>		
Miscarriage / termination of pregnancy in history	103	24.1
<i>Pregnancy</i>		
Primiparity	213	49.8
Fertility treatment	32	7.5
Multiple pregnancy	9	2.1
Pregnancy complications	198	46.3
<i>Delivery</i>		
Preterm delivery < 37 weeks gestation	39	9.1
Postterm delivery > 42 weeks gestation	24	5.6
Induction of labor	82	19.4
Mode		
NVD	316	74.5
IVD	37	8.7
UPCS	37	8.7
PCS	34	8.0
Pain medication	101	23.6
Location delivery		
Home	86	20.1
Hospital	298	69.6
Referral from home to hospital	44	10.3

M, median; SD, standard deviation; NVD, normal vaginal delivery; IVD, instrumental vaginal delivery; PCS, planned cesarean section; UPCS, unplanned cesarean section.

validated with clinical interviews. As an estimate of the internal consistency of the scale, Cronbach's α was calculated at 0.84 [2]. Items are posed as statements. The DSM-IV A criterion (traumatic experience) includes four statements, asking subjects to respond according to how they felt during delivery: (1) "the childbirth was a trying experience"; (2) "the childbirth was a threat to my physical integrity"; (3) "during the childbirth I was afraid that I and/or my baby was going to die or be seriously harmed"; (4) "during the childbirth I felt anxious/helpless/horried".

The PSS-SR [16] is a widely used generic measure for diagnosing PTSD following a variety of traumatic events, which can be adapted according to the stressor of interest. Psychometric properties in a non-post partum women population included a good internal consistency (Cronbach's $\alpha = 0.91$) and test-retest reliability (0.74) [16]. Using the Structured Clinical Interview for DSM-IIIIR (SCID) as gold standard [26], the PSS-SR has a sensitivity of 0.62, specificity of 1.0 (i.e., no false positives), a positive

Table IV. Description of characteristics of TES-B and PSS-SR.

Criterion	Instructions referring to	No. of items	Scale	Cut-off value item	Items needed to meet criterion	Answer categories
A1	T: feelings during delivery (self and baby)	3	T: 0–3	T: ≥ 2	T: ≥ 1	T: not at all; somehow; much; very much
	P: feelings about delivery in past week (self)	2	P: 0–3	P: ≥ 1	P: ≥ 1	P: not at all; a little bit; much; very much
A2	T: emotions during delivery	1	T: 0–3	T: ≥ 2	T: –	T: not at all; somehow; much; very much
	P: emotions about delivery in past week	3	P: 0–3	P: ≥ 1	P: ≥ 1	P: not at all; a little bit; much; very much
B	T: how subject feels now	5	T: 0–3	T: ≥ 2	T: ≥ 1	T: never/not at all; rarely; sometimes; often
	P: how symptoms affected in past week*	5	P: 0–3	P: ≥ 1	P: ≥ 1	P: never; once; 2–4 times; 5 or more times
C	T: how subject feels now	7	T: 0–3	T: ≥ 2	T: ≥ 3	T: never/not at all; rarely; sometimes; often
	P: how symptoms affected in past week*	7	P: 0–3	P: ≥ 1	P: ≥ 3	P: not at all; a little bit; much; very much [†]
D	T: how subject feels now	5	T: 0–3	T: ≥ 2	T: ≥ 2	T: never/not at all; rarely; sometimes; often
	P: how symptoms affected in past week*	5	P: 0–3	P: ≥ 1	P: ≥ 2	P: never; sometimes; often; very often/always [†]
E	T: duration of ≥ 1 symptoms (in months)	1	T: 0–> 12	T: ≥ 1	T: –	T: < 1 month–> 12 months (and “not applicable”)
	P: (no explicit question)	0	P: –	P: –	P: –	P: –
F	T: how much ≥ 1 symptom affects daily functioning	1	T: 1–10	T: ≥ 6	T: –	T: not at all influenced–very much influenced
	P: (no explicit question, sum-score calculation) [†]	0	P: 0–54	P: ≥ 18	P: –	P: –

T, TES-B [2]; P, PSS-SR [25]; –, not applicable.

*English version [16] referred to “in the past 2 weeks”.

[†]items C1/C2/D1 have the same answer categories as criterion B.

predictive power of 1.0 and a negative predictive power of 0.82 [16]. In this study a Dutch translation of the PSS-SR [25] (used before for PTSD following childbirth [9]) has been administered. In addition to the 17 symptom items used in the original study (posed as questions), Arntz [25] added items relating to the DSM-IV A-criterion (traumatic experience). Women are asked to what extent, during the past week, they were convinced that during the delivery (1) “they could have been seriously hurt” or (2) “their life was threatened”, and whether in the past week they had felt (3) guilty (4) ashamed and/or (5) angry about the delivery. As proposed by Dunmore et al. [27], a sum-score of 18 or more was considered an indication of significant severity of symptoms (criterion F). The PSS-SR does not assess the E-criterion (symptoms present at least one month) explicitly.

In addition, a specially designed 30-item questionnaire focusing on demographic factors, obstetric background, logistic features of the labor process, and expectations and appraisal of the delivery was administered. Data regarding complications and interventions during pregnancy and delivery were obtained from patient charts. The following pregnancy complications were included: hyperten-

sion, pre-eclampsia/HELLP-syndrome, blood loss, intra-uterine death, congenital defects, membranes ruptured before 37 weeks gestation, and membranes ruptured longer than 24 h.

Statistical methods

Data were analyzed with SPSS 15.0, using an α of 0.05. In order to assess internal consistency, Cronbach’s alphas and inter-item correlations (IICs) were calculated. The associations between TES-B and PSS-SR were evaluated using Spearman’s rank order coefficient, kappa’s (κ) and intraclass correlation coefficients (ICC), where appropriate. As part of the internal validity, the dimensional structure of both instruments was assessed with principal components analysis (PCA).

Quantitative analysis

Reliability

Based on the current data set, the internal consistency of both scales was assessed. Cronbach’s α for the 17 symptom items was 0.87 for the TES-B and 0.82 for the PSS-SR, which is in line with the original

studies [2,16]. Considering that α is influenced by the number of items in a scale, the IICs of the 17 symptom items were also calculated, generating acceptable values for both TES-B (0.29) and PSS-SR (0.27). Assessing criteria B, C, and D separately generated IICs of 0.47, 0.28, and 0.39 for the TES-B and 0.32, 0.23, and 0.30 for the PSS-SR.

Five of the 428 respondents fulfilled the DSM-IV criteria for PTSD (1.2%) on the TES-B, compared with three participants on the PSS-SR (0.7%). One woman met the criteria on both scales, yielding a κ of 0.24. A PTSD symptom-profile (meeting DSM-IV criteria B, C, and D), as used in several previous studies, was found in 3.7% the women on the TES-B and in 9.1% on the PSS-SR ($\kappa = 0.33$). Sum-scores on the TES-B and PSS-SR correlated strongly (Spearman's rank order coefficient, $r = 0.78$). Additionally, the ratio between the variance between the two instruments (ideally zero) and between cases was assessed by calculating a single measures type C ICC ($\text{ICC}(C,1) = 0.78$).

κ coefficients were calculated for each of the 17 (dichotomized) symptoms as well as the (dichotomized) DSM-IV criteria (except E, as the PSS-SR does not include an explicit question regarding the duration of symptoms), using the cut-off values as described in the Methods section. κ thereby indicates the degree of agreement between the TES-B and

PSS-SR on whether or not respondents meet the criterion in question (Table V).

Despite the rather high ICC and Spearman's rank order coefficient suggesting otherwise, the low κ coefficients reveal that agreement between the two instruments is poor: the questionnaires did not identify the same cases, and substantial discrepancies in the percentage of women suffering from specific symptoms were found. Our findings demonstrate that consistency in sum-scores of the two instruments is mainly found in women with low scores, while respondents with moderate to severe symptoms on the TES-B were not identified with the PSS-SR, and vice-versa. This is an issue of concern, as it reveals that not only detection of PTSD "cases" but also the identification of women with symptoms depends to a considerable extent on the instrument used.

Validity

The dimensional structure of the 17 symptom-items of the TES-B and PSS-SR was evaluated by means of PCA, with the goal of determining: (1) whether the three subdimensions of PTSD as listed in the DSM-IV could be identified; (2) whether the subdimensions of the TES-B and PSS-SR were similar; (3) whether the differences in response formats might have affected the responses.

Table V. Associations and degree of agreement between TES-B and PSS-SR.

Criterion	Item	TES-B (%)	PSS-SR (%)	κ
A – Traumatic experience		9.1	1.4	0.11
	1. Threat to self or others	38.1	3.5	0.06
	2. Emotional response to stressor	10.0	3.7	0.23
B – Re-experiencing		13.6	26.9	0.44
	1. Intrusions	10.3	20.3	0.50
	2. Dreams	1.6	3.5	0.63
	3. Flashbacks	1.4	9.1	0.11
	4. Psychological distress	8.4	9.6	0.27
	5. Physiological reactivity	4.7	2.8	0.29
C – Avoidance and numbing		7.9	21.7	0.35
	1. Avoid thoughts/feelings	4.7	7.0	0.41
	2. Avoid activities/places	3.0	3.5	0.48
	3. Inability to recall	22.7	25.2	0.57
	4. Diminished interest	18.9	37.1	0.38
	5. Detachment/estrangement	11.0	30.6	0.26
	6. Diminished affect	6.1	14.3	0.31
	7. Foreshortened future	3.3	16.1	0.22
D – Hyperarousal		26.6	63.1	0.32
	1. Sleeping difficulties	3.3	43.9	0.08
	2. Irritability	22.2	59.3	0.25
	3. Concentration problems	34.8	58.9	0.46
	4. Hypervigilance	17.8	32.2	0.32
E – Duration	5. Exaggerated startle response	15.4	16.6	0.49
		44.2	–	–
F – Disability		13.8	3.3	0.29

–, no item in PSS-SR regarding duration of symptoms.

Percentages indicate the proportion of women meeting cut-off values of each instrument according to the criteria described in the methods section.

For both instruments, the 17 symptom-items were included in the analysis (extraction method: PCA). Loadings on all items were sufficient for both TES-B (range: 0.41–0.70) and PSS-SR (range: 0.34–0.68). The three DSM-IV subdimensions (re-experiencing, avoiding, hyperarousal) could not be confirmed in this study, as scree plots indicated two relevant factors for both instruments. The results of subsequent varimax (orthogonal) rotation over two factors with Kaiser normalization are displayed in Table VI. Previous studies have also challenged the three-dimensional structure of the DSM-IV symptoms. Occasionally, two underlying factors (intrusions/avoidance, hyperarousal/numbing) [28,29] were found, whereas others reported four underlying factors [30–33]. The present findings suggest that PTSD includes a cluster of symptoms shared with other diagnoses (dysphoria) as well as a more specific factor related directly to the effects of encountering traumatic experience is in line with current research on this topic [34]. Possible effects of the specific formulation of questions may not be excluded though, as questions referring directly to the delivery load high on the first component (intrusions/avoidance), and questions not explicitly related to childbirth (referring to symptoms of depression and/or anxiety disorders) load high on the second component (hyperarousal/numbing). This would explain the different loadings of item D1 on the TES-B (component 1) and the PSS-SR (component 2), as the TES-B refers to insomnia *due to thoughts about the delivery*, whereas the PSS-SR just refers to sleeping

difficulties regardless of their cause. The item pertaining to difficulty to remember aspects of the delivery (item C3) loads low on both components for TES-B and PSS-SR, and therefore warrants reconsideration, as has been noted before [30].

Additionally, the 17 TES-B items and 17 PSS-SR items were simultaneously entered for PCA. TES-B and PSS-SR items loading positively on the second component before rotation (Table VI) were found to comprise component 1, and similarly, negative loadings yielded component 2.

Qualitative analysis

A careful comparison between instructions to participants, answer categories, cut-off values, and phrasing of items is summarized in Table IV. Nonetheless, some additional remarks are warranted.

1. The difference in cut-off values is assumed to be one of the major factors responsible for overall higher percentages of women meeting the symptom criteria on the PSS-SR compared to the TES-B. Interestingly though, in the Dutch version of the instruments, the phrasing of the second response alternative (1 on a 0–3 scale) of the PSS-SR is identical to the third response alternative of the TES-B (2, on a 0–3 scale) for a number of questions (namely: *sometimes*), as are the third answer of the PSS-SR and the fourth on the TES-B (*often*). Since some respondents may be guided in their response by the specific

Table VI. Principal component analysis TES-B and PSS-SR.

Item (symptom)	TES-B		PSS-SR	
	Component 1	Component 2	Component 1	Component 2
B1. Intrusions	0.70	0.26	0.70	0.23
B2. Dreams	0.69	0.09	0.66	0.10
B3. Flashbacks	0.66	0.13	0.23	0.10
B4. Psychological distress	0.75	0.18	0.75	0.31
B5. Physiological reactivity	0.70	0.20	0.56	0.03
C1. Avoid thoughts/feelings	0.75	0.12	0.74	0.19
C2. Avoid activities/places	0.76	0.14	0.66	0.11
C3. Inability to recall	0.24	0.36	0.15	0.24
C4. Diminished interest	0.14	0.74	0.20	0.65
C5. Detachment/estrangement	0.12	0.73	0.10	0.72
C6. Diminished affect	0.35	0.51	0.31	0.46
C7. Foreshortened future	0.48	0.40	0.18	0.52
D1. Sleeping difficulties	0.64	0.18	0.01	0.45
D2. Irritability	0.18	0.69	0.13	0.75
D3. Concentration problems	–0.01	0.71	0.04	0.67
D4. Hypervigilance	0.21	0.75	0.16	0.68
D5. Exaggerated startle response	0.21	0.68	0.22	0.52

Extraction method: Principal Component Analysis.

Rotation method: Varimax with Kaiser Normalization.

Items are placed in component with highest loading (bold).

Component 1: mainly delivery-related items, mainly intrusions/avoidance.

Component 2: mainly delivery-unrelated items, mainly hyperarousal/numbing.

- phrasing and others by the numerical value of a response, the effect of this difference is unclear.
2. One of the TES-B items for criterion A1 yielded particularly high scores: “*the childbirth was a trying experience*”. The item in the official Dutch translation of the TES-B uses the Dutch equivalent of “*unpleasant*”. Even though traumatic experiences will be trying or unpleasant, the opposite does not necessarily hold. From a linguistic point of view, the terms *somehow* and (*very*) *much* are not the correct qualifications for items A1 and A2: the childbirth cannot be *much* trying, and “I felt *somehow* anxious” does not make sense. It should be noted though that the Dutch translation contains a more accurate match of item and response categories.
 3. The A criterion in the Dutch version of the PSS-SR [25] referred to feelings in the past week, instead of during delivery (which the DSM-IV lists). By using this phrasing, the item may well measure negative delivery attributions rather than emotions during the event. Secondly, the PSS-SR only refers to a “threat to self”, but disregards a “threat to others” (in this case the baby) as a possible characteristic of the traumatic event. In addition to point 2, this may be another explanation for the markedly lower percentage of women meeting criterion A1 on the PSS-SR than on the TES-B (3.5% *vs.* 38.1 %). Thirdly, the phrasing in the Dutch version of the PSS-SR referred to guilt/shame/anger instead of fear/helplessness/horror as the DSM-IV does.
 4. For criteria B, C, and D, the TES-B consistently uses qualitative descriptions of frequency (*never/not at all, rarely, sometimes, often*), whereas answer categories on the PSS-SR refer to either qualitative frequencies, or quantitative frequencies (number of times in the past week), or intensity of symptoms. The DSM-IV does not provide a solution, as it refers to symptoms being *persistently* present, which could be assessed with both measures of frequency (e.g., two to four times) and intensity (e.g., very much), even though these may yield very different outcomes.
 5. The DSM-IV unequivocally excludes the possibility of symptoms being present before exposure to the traumatic event. This may yield problems, especially in retrospective studies, since it cannot be excluded that posttraumatic stress symptoms overlap with pre-existent PTSD, and/or signs of depression and anxiety, such as anhedonia and hypervigilance. Indeed, in the present sample 26% of the respondents fulfilling the requirements for criterion E reported a duration of (one or more of the) symptoms which is longer than the time between delivery and completing the questionnaire. In accordance with the DSM-IV, both instruments contain items stating explicitly

that symptoms should be present after the delivery only. However, item C7 (foreshortened future) of the TES-B does not distinguish between ante- and post-partum feelings, whereas the PSS-SR adequately assesses whether the feeling of foreshortened future is “*due to the delivery*”. In formulating item D1 (insomnia), the TES-B adds “*because of visions or thoughts of the delivery*”, whereas the PSS-SR only asks if the respondent has sleeping problems. Since this is not uncommon with a newborn, it is not likely a sign of psychopathology. The TES-B formulation, however, that it should be visions or thoughts of the delivery that cause the insomnia, is not in line with the DSM-IV requirements, even more so because sleeping difficulties are regarded as a sign of hyperarousal instead of re-experiencing.

6. The PSS-SR does not measure DSM-IV criterion E, and considers criterion F to be met with a certain sum-score of the 17 symptom items, rather than explicitly asking for disability and impairment. This is also a point of concern, as omitting criteria E and F from PTSD questionnaires has been shown to have marked effects on the prevalence of PTSD measured [35]. Furthermore, the absence of criterion E may have resulted in an overestimation of prevalence. It should be noted that, even though the PSS-SR is still frequently used, Foa et al. developed an instrument based on the PSS-SR that does contain all DSM-IV criteria (the Posttraumatic Diagnostic Scale [36]).
7. It is interesting that a small proportion of women (1.8% on TES-B and 2.1% on PSS-SR) fulfill all DSM-IV criteria except A, implying that they suffer from PTSD symptoms but did not experience their childbirth as traumatic. A number of explanations could account for these findings, one being pre-existent PTSD, given that the point prevalence of PTSD in women is estimated at 0.37% [37]. It might also be that the less severe an event is, the more vulnerability factors such as personality characteristics play a role in the development of PTSD [38]. Alternatively, women might experience difficulties in remembering certain parts of the delivery (in this sample 22.7% on the TES-B and 25.2% on the PSS-SR), which they therefore do not recall as being traumatic.

Limitations

Although one could argue that the failure to exclude women with stillbirths and late pregnancy terminations could be a confounder, the unselected population of this study justifies the inclusion of all pregnancies, and the low proportion of women with

Table VII. Contents of ideal self-report questionnaire for measuring PTSD following childbirth.

Items part of	Instructions referring to	Answer categories relating to	Cut-off value per item
Criterion A1	feelings during the delivery: life endangered, threat to physical integrity (self or baby)	intensity	≥ 2 (on 0–3 scale)
Criterion A2	emotions during the delivery: fear/helplessness/horror	intensity	≥ 2 (on 0–3 scale)
Criteria B, C, and D	feelings and emotions during the past month; symptoms not present before delivery	intensity or frequency (consistent)	≥ 2 (on 0–3 scale)
Criterion E	duration of symptoms (BCD)	duration (in months)	≥ 1 month
Criterion F	impairment of daily functioning	intensity	≥ 6 on 1–10 scale (not at all impaired \leftrightarrow very much impaired)

stillbirth or termination ($N=4$) is not likely to influence results. The unselected population may be regarded as an advantage, as it does not restrict the outcomes of this study to particular patient groups. The retrospective nature of this study is one of its main limitations, since women with pre-existent PTSD could not be excluded from the analyses. The response rate (47%) is considered acceptable, and the proportion of home deliveries in this study (20%) is in line with the general Dutch population (23%) [39]. As with much research involving self-report questionnaires, highly educated women are over-represented in this sample and (non-western) immigrants are underrepresented.

Recommendations

Given the fact that both measures have their strengths and weaknesses, the decision which questionnaire is to be preferred needs some consideration. The cut-off value used in the TES-B corresponds better with the notion that symptoms should be “pervasive”; the phrasing of answer categories is more consistent; and all criteria are explicitly assessed. However, the formulation of criterion A1 (“*childbirth was a trying experience*”) poses a low threshold. The PSS-SR is a validated questionnaire with good internal consistency, and adequate sensitivity and specificity. Moreover, it has a clearer factor structure than the TES-B. The original version of the PSS-SR [16] does not contain criteria A, E, and F. In the Dutch translation criterion A has been added, but it contains several aspects that are not in line with the DSM-IV requirements. Additionally, consistency in response categories for criteria BCD is lacking (frequency vs. intensity of symptoms). Furthermore, the absence of criterion E may result in an overestimation of prevalence.

On the basis of the qualitative analysis, the contents of an “ideal” self-report measure for PTSD following childbirth have been formulated (see Table VII). Additionally, two suggestions for

phrasing of items can be made: (1) omission of the item “childbirth was a trying experience” in the TES-B; and (2) in referring to difficulties sleeping (item C1), addition of the phrase “not due to being awoken by my baby” instead of referring to the delivery (TES-B) or no explicit mentioning (PSS-SR).

Considering that quantitative analysis revealed limited agreement between the two instruments, comparison of research findings based on different instruments to assess the prevalence of PTSD following childbirth should be done with utmost caution.

As reported by Ayers et al. [24], it is topic of debate whether PTSD should be seen as a dichotomy or a continuum. Even though the cases identified and percentages of women meeting specific criteria differ depending on the instrument used, we consider it of clinical relevance that many women clearly suffer from posttraumatic stress symptoms following childbirth even though they do not meet all DSM-IV criteria.

Conclusions

Given the limited agreement ($\kappa = 0.24$) between the TES-B and PSS-SR, two widely used instruments for measuring PTSD following childbirth, comparison between studies using different instruments for measuring PTSD following childbirth should be done with utmost caution. The subdimensions identified with Principal Components Analysis were rather similar for TES-B and PSS-SR, but both measures failed to confirm the DSM-IV three symptom categories, as the identified subdimensions distinguished only between childbirth-related factors (re-experiencing/avoidance) and more general symptoms of depression and anxiety (hyperarousal/numbing). The current study resulted in a number of recommendations for instruction to respondents, phrasing of items, answer categories and cut-off values that may enhance the validity and

comparability of instruments for measuring PTSD following childbirth.

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Current knowledge on this subject

- Various instruments, some generic and others specific, are being used to measure PTSD following childbirth.
- Several instruments do not assess all DSM-IV criteria for PTSD.
- The prevalence estimates of posttraumatic stress (disorder) following childbirth range from 0% to 14.9% between 1 and 14 months after childbirth.

What this study adds

- Reliability- and validity analyses demonstrate similar, acceptable values for internal consistency, and reveal a two-dimensional structure different from the three DSM-IV subcategories for both TES-B and PSS-SR.
- Large differences are found in operationalization of the two instruments, i.e., in formulation of questions, answer categories, cut-off values, and instructions to respondents.
- Comparison between studies using different instruments for measuring PTSD following childbirth should be done with utmost caution.