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Posttraumatic Stress Following Childbirth: Psychometric Properties of the Brazilian Version of the City Birth Trauma Scale

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Abstract

Objective: to seek validity and reliability evidence of the Brazilian version of the City Birth Trauma Scale (BiTS-Br) and establish diagnostic accuracy. Method: 343 mothers (up to one year after childbirth, 30.8 years old on average) completed the BiTs-Br and other instruments screening for posttraumatic stress disorder, depression, and anxiety for convergent validity analysis. Structural validity was verified using exploratory techniques (principal components analysis), while discriminant validity was checked using the known-groups method and ROC curve. The Structured Clinical Interview for DSM-5 was applied via telephone interviews. Test-retest reliability was obtained in a 15 to 30-day interval. Results: a two-factor structure was found (birth-related and general symptoms), with excellent test-retest reliability (0.73) and internal consistency (0.91). Moderate/strong associations (>0.62) were found with correlated symptoms and posttraumatic stress. The scale had a diagnostic accuracy of 86.7% and a cutoff point >28 was the most appropriate, with a sensitivity of 72% and specificity of 83%. Conclusions: BiTS-Br presented excellent psychometric indexes, similar to the original version and other cross-culturally adapted versions. Thus, it can be widely used in scientific research and clinical settings to support the identification and treatment of PTSD.

Keywords: Stress Disorders, Post-Traumatic; Birth; Scale; Psychometric.

1. Introduction

The diagnosis of Posttraumatic Stress Disorder (PTSD) was included in the third edition of the Diagnostic and Statistical Manual of Mental Disorder (DSM), published in 1980 (American Psychiatry Association [APA], 1980). Since then, this diagnostic category underwent some changes, which involved both the definition of traumatic events

and diagnostic criteria. In the DSM-5 current edition (APA, 2013), PTSD is defined as a set of symptoms that occur in response to trauma exposure (directly experienced or witnessed), namely: re-experiencing and avoidance of stimuli that are associated with the event, negative cognitions and mood, and hyperarousal, lasting more than one month, causing distress and social or labor impairment. Traumatic events include, but are not limited to, exposure to war/combat, physical and verbal violence (or threat), attacks, accidents, or natural disasters. Therefore, sudden and catastrophic medical events, such as those a mother experiences during labor/childbirth or health problems infants experience during the first days of life, might be included in this category, as long as these problems are associated with the risk of severe injury and/or death to the mother or the infant (Reynolds, 1997; APA, 2013).

Studies conducted in different countries report a high prevalence of birth perceived as traumatic: 21.4% to 34% in Brasil (Zambaldi et al, 2009), 54.4% in Iran (Modarres et al, 2012), 67.2% in Australia (Leinwebe et al, 2017), 34% in the United States (Soet et al, 2003), 44% in Switzerland (Ulfsdottir et al, 2014), as well as the number of women who develop postpartum PTSD. The meta-analysis conducted by Yildiz et al (2017) included 28 studies and reports a prevalence of 5.9% of PTSD 14 days after childbirth. These indexes are higher in high-risk mothers than in community samples (18.5% *vs*. 4%). This condition demands attention as it is seldom investigated, recognized or treated (Ayers et al, 2018), with implications for the mothers' physical and mental health and that of infants and families, impacting society as a whole. Risk factors involve not only the conditions experienced during pregnancy or fear of childbirth, but also previous psychological/psychiatric conditions (e.g., depression) and social conditions such as lack of support, socio-economic disadvantage, and difficulties accessing

obstetrical care, among others (Soet et al., 2003; Zambaldi et al., 2009; Modarres et al, 2012), which are more frequent in developing countries such as Brazil.

The importance of screening and diagnosing PTSD following childbirth has been repeatedly highlighted because it is a condition that can be treated. Self-report screening questionnaires are highly relevant for being low-cost, user-friendly, and easily applied on a large scale (Iragorri & Spackman, 2018). Among the instruments available to screen this condition, the City Birth Trauma Scale (BiTS; Ayers et al, 2018) stands out for being the only instrument that specifically screens birth-related PTSD according to the current DSM-5 criteria.

The BiTS was originally developed in English with 29 items distributed according to the eight DSM-5 diagnostic criteria. It has a two-factor structure represented by birth-related symptoms and general symptoms, which account for 56% of the variance. The scale presented satisfactory internal consistency, convergent, divergent and discriminant validity. These indicators were replicated in cross-cultural studies to obtain the Hebrew (Handelzalts et al, 2018), Croatian (Nakic et al, 2019), Turkish (Bayri et al, 2020), and Spanish (Caparros-Gonzales, 2021) versions. However, the diagnostic accuracy of the scale compared to gold standard clinical interviews has not yet been established.

The BiTS was translated and culturally adapted to Brazil (BiTS-Br) by Donadon et al (2020), presenting excellent content validity. However, the remaining psychometric indicators have not been assessed thus far. Therefore, the aim of this study was to: (1) confirm the reliability and validity of the Brazilian version of the BiTS-Br and (2) establish the diagnostic accuracy of the scale when compared to structured clinical interviews and appropriate cut-off scores.

2. Method

2.1. Sample

This study's minimal sample (310 mothers) was estimated according to the parameters recommended for factor analyses (Hair et al, 2009). Inclusion criteria were: women aged 18+ years old, with a child born up to one year before the study, who signed a free and informed consent form. Those who did not complete data collection or completed the instruments more than once were excluded.

A total of 46 participants were randomly selected for the test-retest reliability (15 to 30 days). The same occurred for the diagnostic accuracy, in which another 60 participants were selected. The flowchart in Figure 1 presents inclusion and exclusion criteria.

Insert Figure 1

2.2. Instruments

The data collection protocol was composed of:

a) City University London Birth Trauma Scale (BiTS): developed by Ayers et al. (2018) and translated and adapted to Brazil by Donadon et al (2020);

b) Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): developed by Weathers et al (2013). It is a 20-item self-report instrument assessing PTSD indicators according to DSM-5. The Brazilian version, adapted by Osório et al. (2017) and Pereira-Lima et al. (2019) was used;

c) Patient Health Questionnaire-9 (PHQ-9): self-report instrument that screens for depressive disorder symptoms. It was originally developed by Kroenke et al. (2001) and psychometrically assessed in Brazil by Osório et al. (2009);

d) Beck Anxiety Inventory (BAI): developed by Beck et al. (1988). It is a 21-item self-report instrument designed to assess the intensity of anxiety symptoms. The version translated and adapted to Brazil by Cunha (2001) was used;

e) Sociodemographic and clinical questionnaire: specifically developed to collect personal information and data concerning pregnancy, labor, women's health, and infant's health;

f) Structured Clinical Interview for DSM-5 Disorders – Clinical Version (SCID-5-CV), developed by First et al. (2015) and later translated and adapted to Brazil by Osório et al. (2019). It is used to support psychiatric clinical diagnoses based on DSM-5. In this study, only its PTSD module was used to verify the presence/absence of this disorder, using childbirths that occurred one year before as the reference trauma.

2.3. Procedures

This study was conducted according to ethical guidelines and was approved by the Institutional Review Board (Opinion Report No. 3.893.242).

The study's sample was recruited through various social and local media. Data were collected online using Google Forms. This form of data collection was chosen for facilitating access to a greater number of participants and for favoring national representation. In addition, it was the methodology used in the original study (Ayers et al, 2018). The participants received a link to a page containing a detailed presentation of the study's objectives and a free and informed consent. Those who negatively answered the question "Do you accept to participate in this study?" were immediately directed to an acknowledgments page, and the study was terminated. Those who consented to participate were asked to provide their age and when their last child had been born. Only those who met the inclusion criteria were granted access to the instruments.

Subsequently, part of the participants were randomly selected (list of random numbers) for the verification of test-retest reliability. They were contacted via e-mail and asked to answer the BiTS-Br 15 to 30 days after initiating the study. Part of the participants were also randomly selected to complete the PTSD module of the SCID-5-CV. They were contacted by telephone and interviewed by a previously trained researcher according to recommendations provided by Osório et al (2019). If women met diagnostic criteria for PTSD they were advised to seek referral to psychological support services in their area.

2.4. Data analysis

The study's data were analyzed using Statistical Package for the Social Sciences (SPSS), version 20.0. Descriptive statistics (mean, standard deviation, median, frequency, and percentage) were used to characterize the sample. The following criteria/analyses were performed for the psychometric study:

a) Internal consistency: Cronbach's alpha coefficient considering values above 0.70 (Hair et al, 2009);

b) Test/retest reliability: Intraclass Correlation Coefficient (ICC), adopting a 95% confidence interval. The parameters recommended by Mukaka (2012) were used to classify the magnitude of correlations: insignificant (<0.30), weak (between 0.30-0.50), moderate (between 0.51-0.70), strong (0.71-0.90), and very strong (above 0.91).

c) Concurrent validity: correlation between BiTS-Br and the PCL-5, PHQ-9, and BAI instruments, using Pearson's correlation. The magnitude of correlations was classified according to the previously mentioned criteria proposed by Mukaka (2012).

d) Discriminant validity: The known-groups method through Student's t-test was used to compare women who underwent emergency C-sections with women who underwent elective C-sections or normal childbirth.

e) Diagnostic accuracy: Receiver Operating Characteristic (ROC) curve was calculated to determine cutoff points that: i) maximize both sensitivity and specificity; ii) maximize sensitivity (without decreasing specificity to low levels); or iii) maximize specificity (without decreasing sensitivity to low levels).

f) Exploratory Factor Analysis (EFA): principal components with varimax rotation. The following criteria were used: Kaiser-Meyer-Olkin (KMO) $\geq$0.60; significant Bartlett's test of sphericity; eigenvalues above 1 to compose the factors; factors' percentage of the variance of approximately 60%; and item's minimum factor loading of approximately 40% (Floyd & Widaman, 1995).

A level of significance $p \leq 0.05$ was adopted in all the analyses.

3. Results

The study's sample was composed of 343 mothers, aged 30.8 on average. Among these, 60.9% were primiparous women, 38.77% reported spontaneous vaginal birth, 24.78% underwent planned cesarean sections (CS), and 36.44% underwent emergency CS. Approximately one-third of the sample reported complications during childbirth or postpartum. According to the score obtained in the BiTS-Br, 38.5% of the participants met the stressor criterion for PTSD (criterion A1, related to a belief that they or their infants would be severely injured or die). Details of the sample characteristics are presented in Table 1.

Insert Table 1

Internal consistency indicators and the test-retest reliability are presented in Table 2. The total scale had a Cronbach's alpha=0.91, which is considered excellent. The subscales of symptoms also presented alpha values above 0.70. The items correlations with the total score ranged from 0.10 to 0.66. Only three items (1, 10, 25) presented correlations below 0.40. The test-retest reliability was appropriate for the total scale (0.73) and subscales of symptoms and individual items.

Insert Table 2

The BiTs-Br construct validity indicators are presented in Tables 3 to 6. Regarding structural validity and exploratory factor analysis (KMO= 0.93, Bartlett's test=3708.84; $p<0.001$), a two-factor structure explained 54.85% of the variance (38.27% and 16.58%, respectively). The factor loading of each item in the different factors is presented in Table 3. Factor 1, called birth-related symptoms, is composed of items 3, 4, 5, 6, 7, 8, 9, 11, 12 (factor loading $\geq$0.59) and Factor 2, called general symptoms is composed of items 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 (factor loading $\geq$0.57). Item 10 was the only item that did not present appropriate factor loading in any of the factors.

Insert Table 3

The BiTS-Br convergent validity indicators, presented in Table 4, indicate the adequacy of this psychometric attribute. The total scale's correlation with PCL-5, an instrument used to assess PTSD, was excellent (0.84). The same was found regarding the correlations between the symptoms subscales of both instruments (0.47 to 0.78 - birth-related symptoms and general-symptoms). Correlations with correlated constructs were predominantly moderate/strong: depression (0.73 for the total scale and 0.45 to 0.76 subscales), and anxiety (0.62 total scale; 0.44 to 0.62 birth-related symptoms and general-symptoms subscales).

Insert Table 4

The BiTS-Br discriminant validity was initially performed using the known-groups method, and a statistically significant difference was found ($p<0.001$). The mothers who underwent emergency C-sections scored higher in the BiTS-Br (mean: 28.0; SD: 14.2) than those who underwent an elective C-section or spontaneous vaginal birth (mean: 22.6; SD=13.05).

Diagnostic accuracy was examined using the SCID-5-CV PTSD module as a reference. The ROC curve (Figure 2) shows an area under the curve of 0.85 (95%CI: 0.75-0.95). Table 5 presents the scale's sensitivity and specificity according to different cutoff points.

Insert Figure 2

Insert Table 5

Table 5 shows that a cutoff point >28 is the one that best balances sensitivity and specificity (72% and 83%, respectively). A cutoff point >23 increases the instrument's sensitivity by 16%, with a loss of approximately 20% of specificity, while a cutoff point >31 increases specificity by 7%, with a loss of 4% of sensitivity.

The BiTS-Br diagnostic accuracy, rated according to DSM-5 diagnostic criteria for PTSD, is 86.7% (sensitivity 72%; specificity 92%) with Kappa index of agreement of 0.67 (see Table 6). Considering the study's total sample, 24.8% of the women (N=85) would meet the BiTS diagnostic criteria for birth-related PTSD, while 36.4% (N=125) would meet the criteria using the cutoff point proposed (>28). These parameters are close to the PTSD diagnostic percentage (30%) when using the gold standard instrument (SCID-5-CV).

Insert Table 6

4. Discussion

This study reveals that the BiTS-Br validity and reliability indicators were appropriate, in accordance with the original version in English (Ayers et al, 2018) and the adapted versions, i.e., Hebrew, Croatian, Turkish, and Spanish (Handelzalts et al, 2018; Nakic et al, 2019; Bayri et al, 2020; Caparros-Gonzales, 2021). It is also the first study to establish the diagnostic accuracy of the City BiTS and appropriate cut-off scores. The sample addressed in this study is similar to the samples addressed in these cross-cultural studies, especially regarding sociodemographic characteristics: primiparous women aged 30 on average, with a college degree, and living with a partner. However, regarding obstetrical conditions, the percentage of spontaneous vaginal birth in this sample was much lower than that found in the other samples. Boerma et al (2018) noted that high levels of C-sections are observed in Latin America, especially in Brazil (approximately 55% of births), among highly educated women and not always associated with medical reasons. Domingues et al (2014) report that 27.3% of a cohort of Brazilian women preferred C-sections, mainly out of fear of childbirth-related pain. These indexes reached 73% when multiparous women who had previously undergone a previous C-section in a private hospital were considered. Also noteworthy are the high rates of complications during childbirth and postpartum (35% to 40%) and infants' health conditions (26%), which, according to Machado-Junior et al (2009) and Domingues et al (2014), may be associated with the prevalence of C-sections. These indexes probably reflect the higher percentage of women who met criterion A (BiTS) for PTSD in this study (38.5% in this study *vs*. <26.7% in studies with British, Hebrew and Croatian women) (Ayers et al, 2018; Handelzalts et al, 2018; Nakic et al, 2019). However, more specific studies that assess the type of delivery performed and its associations with PTSD need to be further explored in further studies.

Additionally, 38.5% of the women also reported mental health treatment before childbirth. This is in line with the population study by Viana and Andrade (2012), which reports that 44.8% of the population of a large urban center in Brazil had a mental disorder.

The BiTS internal consistency was in line with the theoretically expected parameters (Hair et al, 2009) and with those from previous studies presenting excellent indicators (Cronbach's alpha above 0.70 for the symptoms subscales and 0.91 for the total scale). Item total correlation was also appropriate for approximately 90% of the items (>0.40); that is, removing any of the items would not improve alpha, reflecting the individual items' adequacy to measure the construct. The same occurred with the test-retest reliability, the indicators of which were above 0.65 (intraclass correlation coefficient). Bayri et al (2020) is the only study that assessed this indicator in a more extended period (two to six weeks) and reported equally good test-retest reliability (Pearson's correlation >0.97).

The BiTS-Br internal structure was assessed using exploratory factor analysis. The results are in line with the original study (Ayers et al, 2018), in which two factors were identified and explained 56% of the variance and showed high correlation (0.45). In this study, the same number of factors was found, with the same composition and percentage of equivalent variance (54.8%). Factor 1 (birth-related symptoms) was responsible for the highest percentage of variance and was composed of 11 items, nine of which were originally related to the subscales of re-experiencing and avoidance, in addition to two items of the negative cognitions and mood subscale. The other factor (general symptoms) was composed of negative cognitions and mood subscale and hyperarousal items, totaling 10 items. The correlation between factors was 0.41, with appropriate indicators of internal consistency (>0.89). Like the original study, item 10,

not able to remember details of the birth, was the only item that did not load on any factor. As suggested by Ayers et al (2018), it may be related to the fact that these memories are given greater attention and are frequently discussed so that mothers are more likely to remember them.

These findings diverge from those reported by PTSD-related instruments, in which the presence of a larger number of factors is common (Eddinger & McDevitt-Murphy, 2017; Boeschoten et al, 2018; Grau et al, 2019). However, these findings are in line with the results concerning the internal structure of Post-Traumatic Stress Disorder Checklist - civilian version, applied to a sample of first responders (Passos et al, 2012) in which a two-factor solution (re-experiencing/avoidance, numbing/hyperarousal) was the most suitable, and also with findings associated with specific birth-related PTSD instruments (Handelzats et al, 2018). Additionally, the bi-factor structure was also found in studies evaluating the BiTS in Hebrew, Croatian, Turkish, and Spanish populations, using either confirmatory or exploratory techniques (Handelzalts et al, 2018; Nakic et al, 2019; Bayri et al, 2020; Caparros-Gonzales, 2021). The results draw attention to the fact that the type of violence/stressor experienced may influence the clinical manifestation of symptoms, which should be the object of future research. It is essential to consider that, as noted by Passos et al (2012), some theories state that avoidance symptoms are secondary to re-experiencing, which would explain the relationship between them. These authors highlight theories explaining the development of PTSD due to associative conditioning and non-associative sensitization, in which PTSD symptoms, as grouped here, would represent these two dimensions.

Convergent validity was verified using a general measure of PTSD (PCL-5). The result was excellent (0.84), also showing strong associations between the respective subscales of symptoms. Handelzats et al (2018) and Nakic et al (2019) report equally

robust correlations with the Impact of Event Scale-Revised, which assesses subjective distress caused by traumatic events (Caiuby et al, 2012). The correlation between the BiTS-Br and correlated constructs (depression and anxiety) was also appropriate (0.73 and 0.62, respectively), as previously shown by Handelzats et al (2018) and Nakic et al (2019), showing evidence of how adequate psychometric indexes are at this level.

Discriminant validity was analyzed by comparing the scores obtained with the known-groups method. Nakic et al (2019) verified that primiparous mothers who underwent emergency C-sections or traumatic childbirth obtained the highest scores in the BiTS. The same was found in this study among women who underwent emergency C-sections and, as expected, PTSD indicators were also higher. Additionally, this study is the first to examine diagnostic accuracy and identify the scale's accuracy indicators compared to the DSM-5 criteria. A kappa coefficient equal to 0.67 and diagnostic accuracy of 86% was found when compared to the gold standard structured clinical interview (SCID-5-CV). These results were considered excellent and show the BiTS discriminant capacity and diagnostic accuracy. The cutoff points most appropriate for PTSD diagnostic screening were established as a score >28, which provides a sensitivity of 72% and specificity of 83%. The BiTS-Br percentage of accuracy is in line with what was recently reported for PCL-5 (80%; Pereira Lima et al, 2019).

A PTSD prevalence of between 24.8% and 36.4% of the sample was found when using BiTS to diagnose PTSD. These indexes are much higher than those found in Croatia (11.8%), Turkey (7.9%), England (7.8%), and Israel (2.4%) using the same instrument (Nakic et al, 2019; Bayri et al, 2020; Ayers et al, 2019, Handelzalts et al, 2018). This increased prevalence seemed less associated with the instrument's sensitivity as the characteristics of the sample, as the prevalence is similar to the one found when the gold standard clinical interviews were used (30%). Some of the sample's characteristics, such

as high levels of previous mental disorders, obstetric complications, and infants' health conditions, may have contributed to the high prevalence rate, as these are strong risk factors (Andersen et al 2012; Verreault et al 2012, Simpson & Catlin, 2016). Future research examining the scale's cultural invariance could help better understand the importance of such risk factors in postpartum PTSD. Clinically, these indicators point to the need for support programs and specialized care for affected mothers, whether at a psychotherapeutic or pharmacological level, in order to minimize the negative impacts of the disorder, whether for the health of the mother, the baby or the family as a whole. It is suggested that mothers with indicators above the cutoff point on the BiTS-Br scale can be more systematically evaluated by the clinician, and, if necessary, referred for evaluation and specialized treatment.

In general, the findings indicate that, similar to the original BiTS and culturally adapted versions, the Brazilian version of BiTS is psychometrically robust and has good diagnostic accuracy. Hence, it can be used to screen birth-related PTSD, as it is the only postpartum scale using the current diagnostic criteria and presents excellent psychometric properties in different samples. Because it is a brief instrument with a low respondent and administrative burden, it can be widely used, not only in the context of scientific research but also in clinical settings, supporting the identification and treatment of this condition.

This study's limitations include the online strategy used to collect data, as sample biases could not be controlled. As previously mentioned, even though the sample is similar to those addressed in other cross-cultural studies, it does not represent the entire Brazilian population, in which the percentage of women with lower education levels without a partner is much higher (Instituto Brasileiro de Geografia e Estatística, 2010). Additionally, considering per-capita income, access to technological devices is non-linear in the Brazilian context, which should be taken into account. Note that the factor analysis

was based on exploratory techniques, and even though it presented convergent results, confirmatory techniques should improve the analysis.

This study contributes to advance knowledge, as it is the first to more specifically explore BiTS accuracy indicators. Additionally, there is a lack of instruments with this purpose in the Brazilian context. Thus, future studies assessing item response function based on item response theory are suggested.

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Table 1: Sociodemographic and clinical characterization of the participants

Variables	**N (%)**
Age - mean (SD)	30.8 (5.98)
Marital Status – w/ partner	313 (91.25)
Schooling ≥12 years	260 (75.81)
Occupation – Employed	206 (60.05)
Health Problems – current	58 (16.90)
- past	25 (7.28)
Psychological/psychiatric treatment (before birth)	132 (38.50)
Psychological/psychiatric treatment (after birth)	66 (19.30)
Number of Pregnancies – mean (SD)	1.6 (0.96)
Number of children – mean (SD)	1.42 (0.75)
Number of miscarriage – mean (SD)	0.25 (0.51)
Type of childbirth – normal	133 (38.78)
- Planned C-section	85 (24.78)
- Emergency C-section	125 (36.44)
Instrumental Labor	10 (2.91)
Labor complications (self-report)	123 (35.86)
Postpartum complications (self-report)	137 (39.94)
Baby health complications (self-report)	90 (26.23)

Table 2 –BiTS-Br reliability indicators

BiTS	**item-total correlation N=343**	**α/ α item deleted N=343**	**ICC (CI95%) N=46**
Total (items 3 to 22)	---	0.91	0.73 (0.56 – 0.84)
Stressor criterion (items 1 and 2)	---	---	0.87 (0.78 – 0.93)
Re-experiencing Symptoms (items 3 to 7)	---	0.85	0.65 (0.44 – 0.79)
Avoidance Symptoms (items 8 and 9)	---	0.82	0.61 (0.38 – 0.76)
Negative cognitions/Mood (items 10 to 16)	---	0.78	0.69 (0.51 – 0.82)
Hyperarousal (items 17 to 22)	---	0.84	0.71 (0.52 – 0.83)
Duration (item 26)	---	---	0.59 (0.35 – 0.376
Distress (items 27 e 28)	---	0.65	0.56 (0.32 – 0.74)
Exclusion criteria (item 29)	0.43	0.92	0.56 (0.48 – 0.63)
Item 1	0.35	0.92	0.75 (0.59 – 0.85)
Item 2	0.44	0.92	0.77 (0.62 – 0.87)
Item 3	0.62	0.92	0.48 (0.22 – 0.68)
Item 4	0.50	0.92	0.09 (-0.21 – 0.37)
Item 5	0.47	0.92	0.73 (0.55 – 0.84)
Item 6	0.58	0.92	0.63 (0.41 – 0.78)
Item 7	0.61	0.92	0.61 (0.39 – 0.77)
Item 8	0.56	0.92	0.59 (0.36 – 0.75)
Item 9	0.52	0.92	0.41 (0.13 – 0.62)
Item 10	0.30	0.92	0.61 (0.39 – 0.77)
Item 11	0.53	0.92	0.64 (0.42 – 0.78)
Item 12	0.62	0.92	0.37 (0.09 – 0.60)
Item 13	0.59	0.92	0.72 (0.55 – 0.84)
Item 14	0.58	0.92	0.41 (0.13 – 0.62)
Item 15	0.61	0.92	0.47 (0.20 – 0.67)
Item 16	0.62	0.92	0.58 (0.35 – 0.74)
Item 17	0.53	0.92	0.39 (0.11 – 0.61)
Item 18	0.55	0.92	0.73 (0.56 – 0.84)
Item 19	0.57	0.92	0.54 (0.30 – 0.72)
Item 20	0.66	0.92	0.60 (0.37 – 0.76)
Item 21	0.55	0.92	0.65 (0.44 – 0.79)
Item 22	0.54	0.92	0.47 (0.21 – 0.67)
Item 23	0.60	0.92	0.71 (0.53 – 0.83)
Item 24	0.58	0.92	0.67 (0.47 – 0.80)
Item 25	0.11	0.92	0.30 (-0.01 – 0.55)
Item 26	0.43	0.92	0.59 (0.35 – 0.76)
Item 27	0.63	0.92	0.42 (0.14 – 0.64)
Item 28	0.51	0.92	0.46 (0.19 – 0.67)
Item 29	---	---	0.80 (0.66 – 0.89)

Table 3- BiTS-Br Exploratory Factor Analysis (N=343)

Item	**Factor 1**	**Factor 2**
Item 3	**0.79**	0.23
Item 4	**0.59**	0.22
Item 5	**0.61**	0.18
Item 6	**0.84**	0.13
Item 7	**0.84**	0.16
Item 8	**0.83**	0.10
Item 9	**0.77**	0.10
Item 10	0.18	0.30
Item 11	**0.75**	0.13
Item 12	**0.80**	0.21
Item 13	0.30	**0.60**
Item 14	0.12	**0.73**
Item 15	0.11	**0.79**
Item 16	0.22	**0.72**
Item 17	0.005	**0.79**
Item 18	0.16	**0.68**
Item 19	0.04	**0.78**
Item 20	0.24	**0.73**
Item 21	0.11	**0.69**
Item 22	0.24	**0.57**
α Cronbach	0.90	0.89
Correlation between factors = 0.41		

Table 4 –BiTS-Br Convergent Validity Indicators

Instrument	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
BiTS Total (Q3 to 22) (1)	1.00													
BiTS –Re-experiencing (2)	0.81	1.00												
BiTS - Avoidance (3)	0.68	0.76	1.00											
BiTS – Negative Cognitions/Mood (4)	0.93	0.64	0.53	1.00										
BiTS - Hyperarousal (5)	0.80	0.38	0.26	0.72	1.00									
BiTs – Birth-related symptoms (6)	0.83	0.96	0.86	0.69	0.38	1.00								
BiTS – general symptoms (7)	0.85	0.42	0.31	0.85	0.96	0.41	1.00							
PCL Total (8)	0.84	0.61	0.50	0.80	0.74	0.62	0.79	1.00						
PCL Cluster B – intrusion (9)	0.74	0.67	0.57	0.66	0.53	0.67	0.58	0.86	1.00					
PCL Cluster C – avoidance (10)	0.67	0.58	0.60	0.62	0.45	0.62	0.52	0.78	0.80	1.00				
PCL Cluster D – negative cognitions/mood (11)	0.78	0.51	0.42	0.79	0.72	0.52	0.78	0.94	0.72	0.67	1.00			
PCL Criterion E – arousal/reactivity (12)	0.74	0.47	0.33	0.70	0.77	0.47	0.77	0.89	0.63	0.52	0.81	1.00		
PHQ (13)	0.73	0.45	0.34	0.70	0.73	0.45	0.76	0.80	0.57	0.51	0.80	0.81	1.00	
BAI (14)	0.62	0.43	0.35	0.57	0.61	0.44	0.62	0.73	0.65	0.53	0.66	0.69	0.65	1.00

Table 5 –BiTS-Br Sensitivity and specificity indicators according to cutoff points

Cutoff point	Sensitivity	Specificity
> 13	1.00	0.405
>15	0.944	0.429
>16	0.944	0.524
>17	0.889	0.548
>18	0.889	0.571
>21	0.889	0.619
>23	**0.889**	0.643
>24	0.833	0.667
>25	0.722	0.690
>26	0.722	0.738
>27	0.722	0.786
>28	**0.722**	**0.833**
>31	0.667	**0.905**
>34	0.556	0.905
>37	0.500	0.929
>39	0.444	0.929

Table 6 – Sensitivity and specificity indicators according to diagnostic category, with SCID-5-CV as the gold standard (N=60)

Instrument	SCID-5-CV (+)	SCID-5-CV (-)
BiTS (+)	13	3
BiTS (-)	5	39
	Sensitivity =72.2%	**Specificity** = 92.8%
Diagnostic accuracy = 86.7%		
Kappa = 0.67		

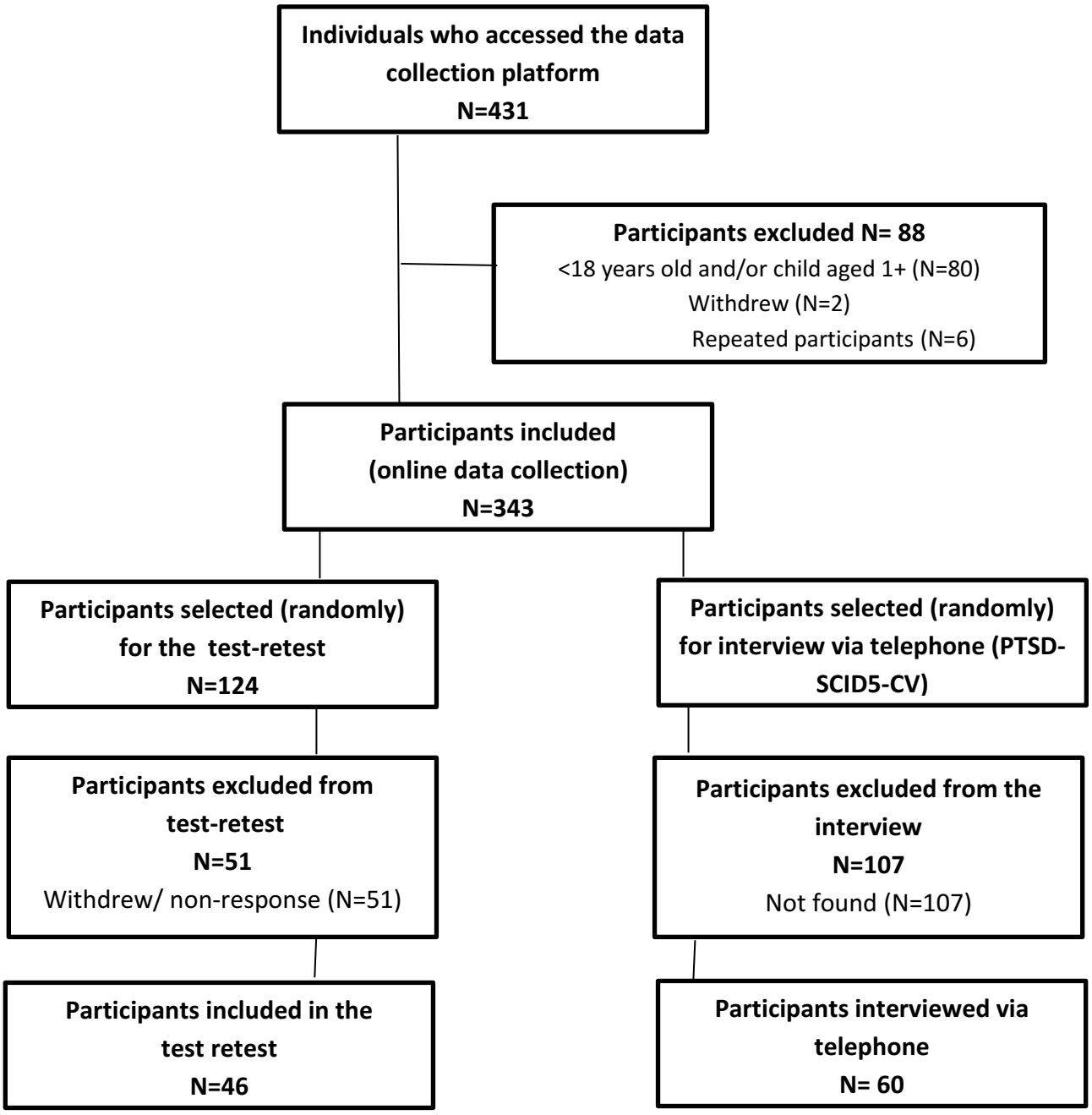

Figure 1 – Flowchart of participant inclusion and exclusion

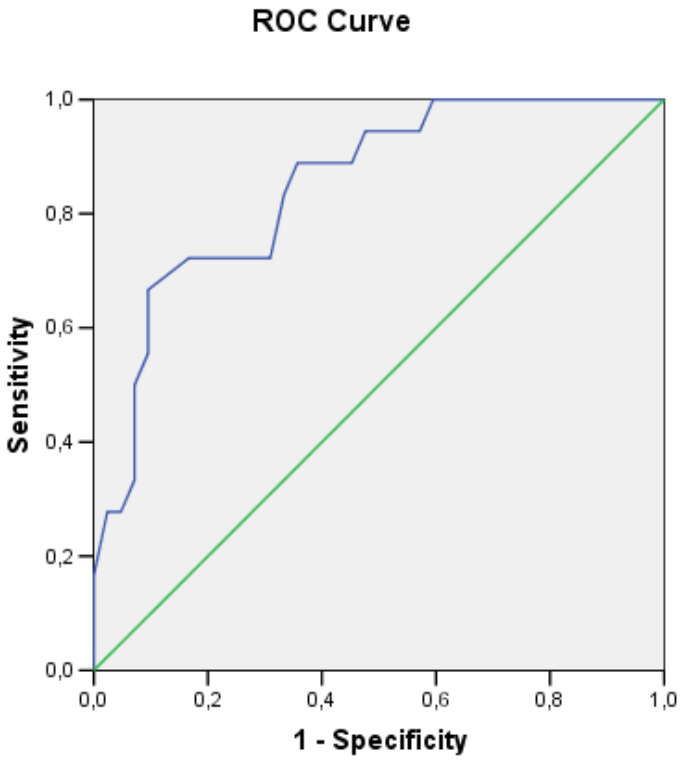

Figure 2 – BiTS-Br ROC Curve