
School of Psychology
Ysgol Seicoleg

# A systematic review of the diagnostic accuracy of the PTSD Checklist for DSM-5 (PCL-5), and an empirical study on the impact of complex post-traumatic stress disorder on postnatal bonding

Thesis submitted in partial fulfilment of the requirement for the degree of:

**Doctorate of Clinical Psychology (DClinPsy)**

South Wales Doctoral Programme in Clinical Psychology

Cardiff University

**Adam Joshua Cann**

**Supervised by: Dr. Cerith Waters, Professor Neil Roberts**

21st September 2023

## Contents

**Acknowledgements**

I would like to thank participants of the Maternal Wellbeing, Mental Health & Life Experiences (MWMHLE) study for your commitment in taking part in this research. Honouring your dedication during such a precious and formative time has been an enormous source of motivation.

I would like to thank my supervisors Dr. Cerith Waters and Professor Neil Roberts for their guidance and encouragement. These projects have offered an invaluable opportunity to learn from your expertise. Thank you to Jenna Evans for her enthusiasm, and diligence on the paper sort and quality ratings. Thank you to the generous authors who contributed additional raw data to the systematic review. Thank you to Dr. Anne M. de Graaff for invaluable methodological advice.

The MWMHLE is a collaboration of the National Centre for Mental Health (NCMH), Health and Care Research Wales, Cardiff, Swansea and Bangor Universities, NHS Health Boards/ Trusts throughout England and Wales. I would like to thank all those who supported the project, particularly Dr. Alistair Souch for the guidance and encouragement.

I would like to thank the team of the South Wales Clinical Psychology Training Programme for their efforts to support trainees impacted by SARS-CoV-2. Thank you to my placement supervisors who shared their knowledge, skills and wisdom Dr. Sian Hocking, Dr. Zoe Moss, Dr. Gerwyn Mahoney Davies, Dr. Hayley Thomas, Dr. Miranda Barbar and Dr. Leigh Gale.

I would like to give a special thanks to the 2020 South Wales DClin cohort for your fortitude, humour and humility.

I would like to pay special thanks to Jessie Gallagher- Michaels, Dr. Eleanor Cowen, Dr. Claire Coysh, Farah Shamsudin, Dr. Louise Payne, Dr. Rita Woo, Brian Toye, Katy Grazebrook, Chris Spicer, Rachel Jefferys, for the opportunities and leadership you have offered me. Thank you to Lizzie Kingdom, Louise Lonergan, Chika Okosi, Nishita Shah, Inderdeep Gahley, Leanne Jones, Asha Patel, Farihah Hafeez Rizvi, Dr. Katie Bryant and Dr. Becca Phillips. Thank you to my closest friends Samantha Littler, Dr. Rachel Price, Luke Hill, Kirsty Needham, Nicola Tin, Mzingaye Jeremiah Khabo and Kevin Küken.

I would like to thank my family Lesley Todman, Graeme Cann, Oliver Cann, Natalie Mayes, Pamela Ashton, David Ashton, Ivan Cann, Joyce Cann, Luisa Castle, Bill Todman, Val Gould, Simon Gould, the wider Cann family, Paddy and Phoebe.

Finally I would like to thank my wife Emma Gould for your support on this joint endeavour and to Joshua for bringing us so much joy and keeping me focused on what is most important. Thank you.

## Preface

*Paper 1: Diagnostic Accuracy Systematic Review*

Paper 1 is a systematic review of the PTSD Checklist for DSM-5 (PCL-5), a 20-item self-report questionnaire widely used to screen for probable PTSD diagnosis in clinical and research settings. PTSD is a common mental health problem that can develop following exposure to a traumatic event. Symptoms of PTSD cause people to relive the traumatic event in flashbacks or dreams; to feel fearful, anxious or shameful; think negatively about themselves; and avoid reminders of the trauma. Self-report questionnaires allow clinicians and researchers to screen for probable diagnosis - which is of use in clinical assessment, treatment evaluation and the estimation of prevalence within research samples.

The accuracy of self-report measures is dependent on identifying an appropriate threshold or 'cut-off' score. Existing PCL-5 scoring guidance published by the National Centre for PTSD suggest thresholds of 31- 33. This review sought to investigate the diagnostic test accuracy of the PCL-5 following the methodology described by the Cochrane Collaboration. Seventeen studies were identified as eligible for meta-analysis. Sensitivity and specificity values across a range of thresholds were entered into a meta-analytic multiple thresholds mixed effects model to estimate an optimal overall threshold (i.e. the highest combined sensitivity and specificity). Sub-group analyses were performed for veteran and outpatient samples.

The model produced an optimal threshold of 36, with sub-group analyses producing varied thresholds for veteran (44) and outpatient (42) samples, higher than the most commonly recommended cut-off scores. Studies included in subgroup analyses attracted low risk of bias and applicability concerns on the QUADAS-2 quality appraisal tool, with high risk of bias associated to studies screening high risk populations. The PCL-5 is an accurate and time efficient measure of PTSD with a range of thresholds for specific populations.

*Paper 2: Empirical Study*

Paper 2 is an empirical study examining the impact of post- traumatic stress disorder (PTSD), complex post- traumatic stress disorder (CPTSD) and depression on postnatal bonding. Mother- infant bonding in the postnatal period is the early emotional connection felt by the mother towards the infant. Depression and Post-Traumatic Stress Disorder (PTSD)

have been associated with impaired bonding, however no studies examining the impact of Complex PTSD on bonding have been published.

Complex PTSD consists of both core PTSD symptoms and disturbance of self-organisation (DSO) symptoms. Complex PTSD has all the core symptoms of PTSD, alongside a cluster of symptoms known as disturbance of self-organisation (DSO). The core symptoms of ICD-11 PTSD are strong intrusive memories in which the sufferer re-experiences the trauma, fearfulness, hypervigilance and avoidance. DSO symptoms include problems in maintaining relationships, struggling to manage emotions and holding a negative view of oneself. CPTSD is thought to be associated with long-term interpersonal trauma – such as repeated physical, psychological or sexual abuse by a trusted person.

This study asked perinatal women, who have given birth in the last 12-18 months, to complete self-report measures to assess CPTSD, PTSD, depression and postnatal bonding difficulties. It was found that people with clinical CPTSD and DSO-only symptoms reported poorer bonding with their infants than those from the 'no trauma disorder' group. Unexpectedly, PTSD and the no trauma disorder group were not significantly different on bonding. Those with CPTSD scored significantly higher on bonding difficulties than those with PTSD.

An analysis was then completed to test a model in which PTSD and DSO symptoms impact bonding, mediated by depression (i.e. the extent to which PTSD and DSO symptoms impact bonding is dependent on depression symptoms). Increased DSO symptoms had significant direct effects elevating bonding difficulties and indirect effects via depressive symptoms. Elevated PTSD symptoms predicted decreased postnatal bonding difficulties. It has been suggested that this may be because mothers with PTSD symptoms attempt to compensate for their concerns about bonding by, for example, seeking to be close to their infants. DSO and depression scores were also shown to covary.

The findings of this study suggest the importance of detecting and examining the impacts of DSO symptoms in further research, symptoms are likely to cause unique impacts on bonding and require specific interventions in the perinatal period**.** It is also suggested that other studies of PTSD, and CPTSD, and postnatal bonding should consider assessing the specific impact of DSO symptoms. This is particularly important as previous criteria for PTSD (e.g. DSM-5) includes DSO-like symptoms, but this is not separated in previous studies on postnatal bonding.

## Paper 1: Diagnostic Accuracy Systematic Review

# The Diagnostic Accuracy of the PTSD Checklist for DSM-5 (PCL-5): a Systematic Review

Adam Joshua Cann[1]

[1] South Wales Doctoral Programme in Clinical Psychology, School of Psychology, Cardiff University, 11th Floor, Tower Building, 70 Park Place, Cardiff, CF10 3AT.

Supervised by:
Dr. Cerith Waters [2]
Professor Neil Roberts [3]

[2] South Wales Doctoral Programme in Clinical Psychology, Cardiff University

[3]Cardiff & Vale University Health Board and Division of Psychological Medicine and Clinical Neuroscience, Cardiff University

Word Count: 6,788

Manuscript was prepared in accordance with the author guidelines for Clinical Psychology Review (see *Appendix A.*).

**Abstract**

The PTSD Checklist for DSM-5 (PCL-5) is a 20-item self-report questionnaire widely used to screen for probable diagnosis in clinical and research settings. The accuracy of a self-report measure is dependent on identifying an appropriate threshold or 'cut-off' score. Existing PCL-5 scoring guidance published by the National Centre for PTSD suggest a thresholds of 31- 33. This review sought to investigate the diagnostic test accuracy of the PCL-5 following the methodology described by the Cochrane Collaboration. A meta-analytic multiple thresholds mixed effects model was used to estimate an optimal threshold (i.e. the highest combined sensitivity and specificity) in R. Sub-group analyses were performed for veteran and outpatient samples. Seventeen studies were identified as eligible for meta-analysis (n= 3349, range 83-629). The model produced an optimal threshold of 36 (pooled sensitivity 82%, specificity 76%). Sub-group analyses produced varied thresholds for veteran (44) and outpatient (42) samples. Studies included in subgroup analyses attracted low risk of bias and applicability concerns on the QUADAS-2 quality appraisal tool, with high risk of bias associated to studies screening high risk populations. The PCL-5 is an accurate and time efficient measure of PTSD with a range of thresholds for specific populations.

*Key words*

PTSD; diagnostic; accuracy; PCL-5; threshold; cut-off

*Highlights*

- The PTSD Checklist for DSM-5 (PCL-5) is widely used in clinical and research settings
- Diagnostic accuracy is dependent on an appropriate threshold or 'cut-off' score
- A multiple thresholds mixed effects model produced an overall threshold of 36
- Sub-group analyses produced varied thresholds for veteran (44) and outpatient (42)
- Recommend thresholds are above existing guidance

## Introduction

Post-Traumatic Stress Disorder (PTSD) is a debilitating and distressing mental health problem that develops following direct or indirect exposure to a threatening event (APA, 2013). It is characterised by repeatedly re-experiencing the trauma in flashbacks or dreams; avoidance of trauma related stimuli; negative affect (e.g. shame, guilt), negative thoughts about the trauma (e.g. self-blame); and trauma-related arousal (e.g. hypervigilance). PTSD can be diagnosed when symptoms cause clinically significant distress or functional impairment, and have been present for at least one month.

PTSD is a common mental health condition. The 2014 UK adult psychiatric morbidity survey (Manus et al., 2016) estimated a prevalence of 4.4% in the general population, based on screening using DSM-IV-TR criteria (APA, 1994). Higher prevalence rates for PTSD were found in women, 16-24 year-olds, those who lived alone and those who were unemployed or on out-of-work disability benefits.

In a longitudinal cohort, increased rates of PTSD have been associated with poorer socio-economic circumstances, experiencing direct interpersonal trauma or victimisation and having lower IQ (Lewis et al., 2019). The prevalence of PTSD is increased in specific groups, including: police officers (Brewin et al., 2022; Rentmeesters & Hermans 2023); veterans (Stevelink et al., 2018); people in conflict zones (Charlson et al., 2019).

Formal diagnosis of PTSD should be established using a structured clinical interview such as the Clinician Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2013a). The administration of these measures however can be time consuming and require specialised training. Self-report questionnaires allow clinicians and researchers to screen for probable diagnosis - which is of use in clinical assessment, treatment evaluation and the estimation of prevalence within research samples. The accuracy of a self-report measure is dependent on having an appropriate threshold, or cut-off score, by which a probable diagnosis can be made. In clinical settings thresholds are also used to establish whether a patient meets clinical caseness before and after treatment. Self-report measures provide an accessible and resource efficient means of identifying mental health problems, which is of particular interest in settings with low- resource and high- demand (Kagee et al., 2013). Frequently used disorder specific self-report measures for PTSD include the Davidson Trauma Scale (Davidson et al., 1997; Davidson et al., 2002); Impact of Events Scale-Revised (Creamer et al., 2003); International Trauma Questionnaire (Cloitre et al., 2018); Mississippi Scale for

Combat-Related PTSD (Hyer et al., 1991); Primary Care PTSD Screen for DSM-5 (Prins et al., 2015); and Posttraumatic Diagnostic Scale (Foa et al., 1997).

The PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013) is a 20-item self-report questionnaire widely used in clinical and research settings. Items are rated on a scale of 0-4 and can be summed for an overall severity score of 0-80. Diagnostic rules and subscale scores can be calculated that map on to DSM-5 PTSD symptom clusters. The PCL-5 may be administered without or without cluster A criteria (identifying the traumatic event), or with a trauma screening questionnaire such as the Life Events Checklist for DSM-5 (LEC-5). Administration guidance is available on the website of the National Centre for PTSD, U.S. Department of Veterans Affairs (VA) (Weathers et al., 2013; https://www.ptsd.va.gov). Weathers et al., (2013) state that cut-offs 31 to 33 should be provisionally applied when administering the PCL-5; but that appropriate cut-off scores are dependent on the goals of the assessment and population being assessed.

The PCL-5 is a psychometrically valid and reliable self-report measure of Post- Traumatic Stress Disorder (Carvalho et al., 2020) that has been validated across a range of settings including specialist outpatient clinics (Boyd, et al., 2022); intensive care (Rosendahl et al., 2019); primary care, (Ferrie et al., 2022). The validity and reliability of the PCL-5 has also been demonstrated with a range of populations including veterans (Bovin et al., 2016); non-clinical/student populations (Ashbaugh et al., 2020); firefighters (Carvalho, et al., 2020) and in multiple languages (e.g. Turkish, Boysan et al., 2017; Chinese, Jiang et al., 2023; Brazilian-Portuguese, Pereira-Lima et al., 2019). The PCL-5 has also been demonstrated to be sensitive to clinical change (Marx et al., 2022).

A recent systematic review of the psychometric evidence for the PCL-5 (Forkus et al., 2023) found good to excellent internal consistency for total scores ranging from 0.90 to 0.97 (e.g. Grau et al. 2019; Boysan et al., 2017). Test-retest reliability for total scores was found to be acceptable across settings (0.91, Carvalho et al. 2020; 0.91, Krüger-Gottschalk et al., 2017), with all but one study reporting a coefficient of >0.60 (0.58, Hall et al., 2019). The PCL-5 showed strong convergent validity with other measures of PTSD (e.g. 0.87 correlation with PCL-C, Bovin, et al., 2016; 0. 82, IES-R, Ashbaugh et al., 2016; 0.89 with PCL-S, Ito et al., 2019). However there were exceptions to this (e.g. 0.44 with PC-PTSD-5, Fung et al., 2019). Reviewers attribute these weaker associations to sample characteristics and the measures selected. The PCL-5 scores were found to have moderate to strong correlations to theoretically related constructions (e.g. depression), but unexpectedly weaker correlations with constructs related to PTSD (e.g. substance-use, Wortmann et al., 2016). Concurrent

validity was also demonstrated by comparing scores on multiple symptom measures for those with and without PTSD (e.g. Rosendahl et al., 2019; Boysan et al., 2017). In conclusion Forkus et al. (2023) judged the PCL-5 has having strong psychometric evidence across settings and with varied samples.

Forkus et al. (2023) found support for cut-off scores of 31-33 in their narrative review, with published studies most frequently recommending thresholds in this range. A wide range of thresholds were reported between studies (23 to 49), which were attributable to different settings (e.g. treatment seeking vs screening in primary care), samples (e.g. severity, comorbidity) and methodologies employed. The reviewers note that there may be no universal threshold for all settings. However evidenced- based recommendations for cut-scores in general and specific populations can inform robust interpretation and application of the measure.

Measures such as the PCL-5 are used to identify probable PTSD diagnosis, reliable change and recovery in primary care mental health services. For example, the PCL-5 is used in the English NHS Talking Therapies for Anxiety and Depression programme (formerly Improving Access to Psychological Therapies, IAPT; National Collaborating Centre for Mental Health, 2023). This national programme of psychological therapy services collectively use the PCL-5 cut-off score of 32 (or above) as the threshold of clinical caseness. PCL-5 scores are considered as part of clinical decision making for treatment, monitoring and discharge planning procedures. Therefore the identification of optimal cut-off scores on the PCL-5 may impact access to trauma-focused therapies for individual patients (e.g. access to trauma-focused CBT or EMDR). The performance of individual therapists and services is also assessed using self-report measures, and may impact commissioning decisions. An accurate threshold for probable PTSD diagnosis therefore has implications for both clinical practice and empirical research.

Diagnostic accuracy studies (DTAs) examine the ability of a test to correctly identify a disease by comparing its performance to a validated reference standard (Bossuyt, 2022). The accuracy of a self-report measure depends on the identification of an appropriate threshold, or cut-off score, for probable diagnosis. The reference standard is used to establish the diagnostic status of participants. Specified thresholds on the index test are then compared to the results of the reference standard, based on the number of cases accurately identified and ruled out. The selection of an accurate threshold balances the ability of the measure to identify true positive cases (sensitivity) and rule out true negative cases (specificity). Rates of sensitivity and specificity can be plotted on a receiver operating

characteristics (ROC) curve to visualise diagnostic accuracy of each threshold (Fan et al., 2006). The area under the curve (AUC) created in ROC space defines the overall accuracy of a measure, with 1 being perfect accuracy and 0.5 representing an accuracy rate no better than chance.

The selection of an optimum threshold will be dependent on the context in which the measure is applied. For example, a clinical pathway may favour higher sensitivity if the clinical risk of a false negative result is high; whereas if further investigations are invasive or risky but with limited clinical benefit, a higher specificity may be favoured. Semi- structured clinical interviews such as the Clinician Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2013a) are the gold- standard in the assessment of PTSD (US Department of Veterans Affairs, 2023). The index test in this review, the PCL-5, has been compared to a number of validated reference standards including the CAPS-5, Structured Clinical Interview for DSM-5—Research Version (SCID-RV; First et al., 2015) and DART (McCabe, 2017).

Since publication and initial psychometric validation, PCL-5 optimum thresholds reported differ between studies and no formal statistical review of PCL-5 thresholds has been published. Existing reviews examine psychometric evidence for the PCL-5 (Forkus et al., 2023) and thresholds for screening tools in specific language and clinical populations (e.g. de Graaff et al., 2021). Forkus et al., (2023) based recommended thresholds of between 31-33 on those which were most frequently found to maximise sensitivity and specificity. However this partially based on studies that did not use a validated structured clinical interview as the reference standard. Reviewers did not take a meta-analytic approach to exploring optimum cut-off scores for diagnostic accuracy, and did not use a formal tool to evaluate the methodological quality of the studies included in their review.

The aim of the present study is to examine the diagnostic accuracy of the PCL-5 when compared to an established semi-structured diagnostic interview. Reviewers sought to evaluate whether the recommended diagnostic thresholds of 31-33 (Weathers et al., 2013; Forkus, et al., 2021; National Collaborating Centre for Mental Health, 2023) is supported by the empirical literature and, if sufficient data were available, perform subgroup analyses to identify optimal thresholds for veteran and outpatient samples.

## Method

This review was pre-registered in the International Prospective Register of Systematic Reviews (ID: CRD42022306732) and follows Cochrane Collaboration diagnostic test accuracy review guidance (Bossuyt et al., 2022). The protocol is attached in the appendix (*Appendix B.*).

### Eligibility Criteria

Studies examining the diagnostic accuracy of the PTSD Checklist for DSM-5 (PCL-5) in comparison to a validated clinician administered semi-structured diagnostic instrument were considered for inclusion. Diagnoses based on a self-report measure, clinical interview or clinician judgement were considered an exclusion criteria. Studies must have been published in English. Only studies with adult (≥18) populations were considered, or those studies with samples of at least 80% adults. There was no minimum sample size. Studies that involved the evaluation of the PCL-5 but not directly addressing its diagnostic accuracy were excluded. To ensure comparable clinical status, screening criteria also included assessing whether there was an acceptable time period between the index test and reference standard (less than 30 days). Studies were not excluded based on country of publication nor on the use of translated versions of the PCL-5.

Initial screening was based on titles and abstracts, and was completed independently by two reviewers (AC/JE). Disagreements or discrepancies were resolved by discussion in consultation with a third reviewer (NR). Where studies reported incomplete information, efforts were made to contact corresponding authors.

### Searches

A systematic search of databases was conducted in December 2022 in consultation with a University librarian with experience of planning search strategies for systematic reviews. The following databases were searched: APA PsycInfo, MedLine, Embase, PubMed, PTSD Pubs and Web of Science. Search terms, including wildcard operators, were as follows: ‘PCL 5’, ‘PCL5’, ‘posttraumatic stress checklist for dsm 5’, ‘post traumatic stress checklist for dsm 5’, ‘ptsd checklist for dsm 5’, ‘posttraumatic stress disorder checklist for dsm 5’, ‘post traumatic stress disorder checklist for dsm 5’. Searches were limited to a start date of 2013 - the publication date of the DSM-5 (APA, 2013). There were a small number (2) of publications added to the screening process in subsequent searches or from authors becoming aware of

new publications. Initial searches and screening did not limit types of publication. Search results were filtered for duplicates in the databases where possible, otherwise this was completed using reference management software.

*Quality Appraisals*

QUADAS-2 (Whiting et al., 2011) is the World Health Organisation recommended quality assessment tool for diagnostic accuracy studies (World Health Organization, 2014). The tool consists of eight categorical risk of bias or applicability ratings for specific study characteristics. Risk bias and applicability can be rated as 'low', 'high' or 'unclear' based on signal questions related to participant selection, administration of the index test, administration of the reference standard, and flow and timing. QUADAS-2 can be adapted to a review based on review aims and the nature of the test being reviewed. In this review, signalling questions were added to inform judgements in three sections. Additions included items on whether PTSD severity and types of trauma were reported (domain 1: patient selection), index test internal consistency statistics (domain 2: index test) and reference standard inter-rater reliability statistics (domain 3: reference standard). In other cases, additional guidance was added to existing signalling questions to guide judgements (e.g. whether comorbidity was reported). These additions were made in line with Sijbrandij et al., (2013).

All QUADAS-2 ratings were independently completed by two reviewers (AC/JE) using standardised forms (*Appendix C.*), discrepancies were resolved by discussion with a third reviewer (NR).

*Data Extraction*

Statistical data extracted for the analysis included sensitivity, specificity, analysis sample size, and prevalence of PTSD established by the reference standard. Using reported data 2x2 tables were calculated (rate of true positives, false positives, true negatives, false negatives) for each threshold using RevMan version 5.4.1. (The Cochrane Collaboration, 2020). Additional statistical data collected included AUC, positive predictive value (PPV), negative predictive value (NPV), diagnostic accuracy (efficiency) where available. To ensure accuracy in the calculation of 2x2 tables, sensitivity and specificity, PPV and NPV were then reverse calculated and compared to the original study results (for at least one threshold her study). Reported data for PCL-5 thresholds encapsulated the lowest and highest recommended thresholds in the included studies. Studies varied in the thresholds reported.

Where data was missing in the article or in supplementary information, corresponding authors were contacted to request 2x2 data.

*Statistical Analysis*

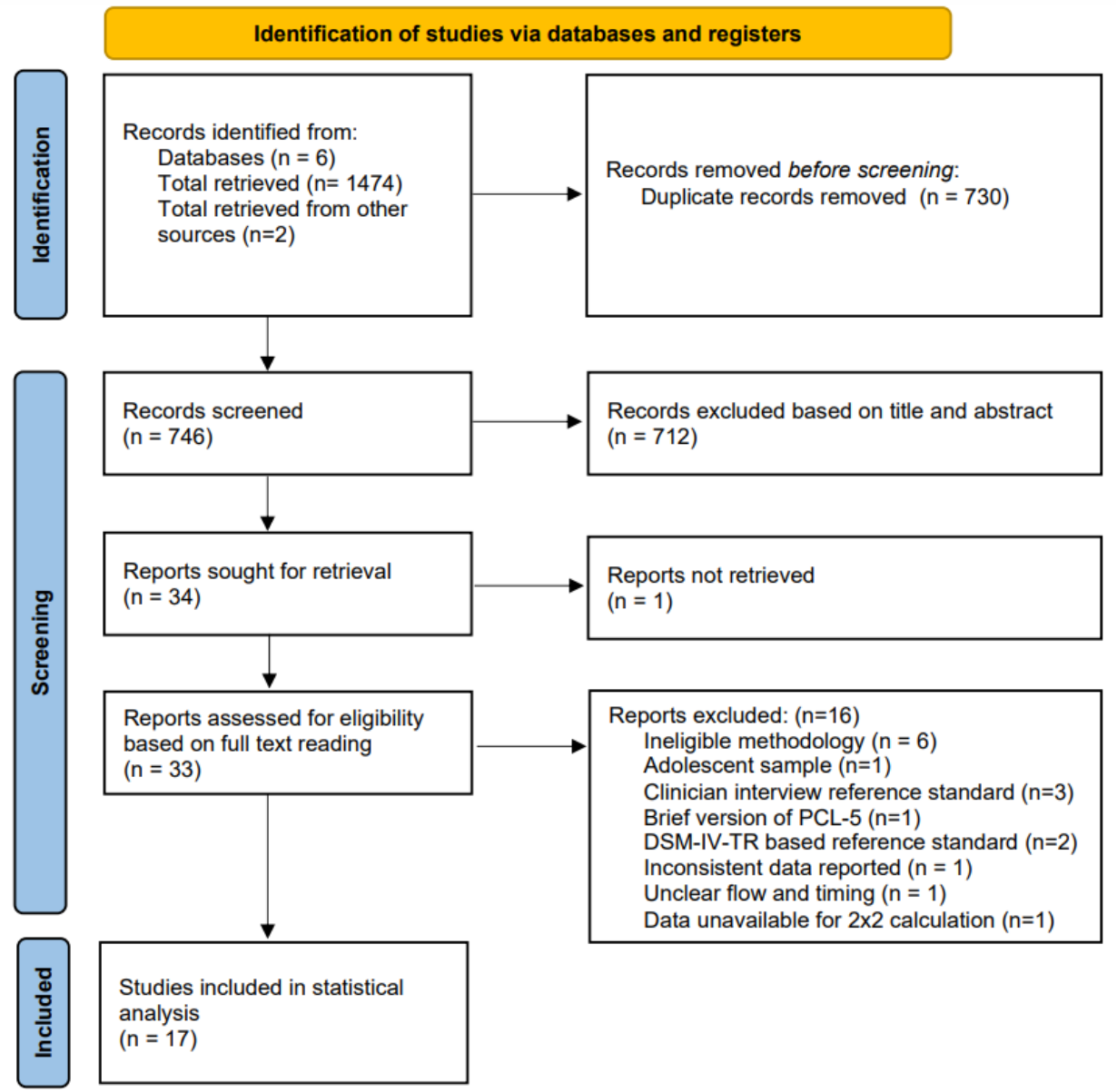
The meta-analytic approach taken in this review uses a multiple thresholds mixed effects model (Steinhauser et al., 2016) which is able to take into account the heterogeneity present between studies in the measurement of test accuracy, and the dependent relationship between sensitivity and specificity. This procedure was used by de Graaff et al. (2021) to investigate the diagnostic utility of self- report measures for common mental disorders in Arabic speaking adults. The model allows for the input of all 2x2 test accuracy data to produce an estimate of sensitivity and specificity across multiple thresholds. Using Youden's index (J), an optimal threshold can be estimated (i.e. the highest combined sensitivity and specificity). An SROC curve was produced that combines the overall sensitivity and specificity estimates, alongside all reported thresholds from the included studies. Sub-group analyses were performed post-hoc to estimate optimal thresholds for studies using veteran and mental health and addiction outpatient samples. This was possible where three or more studies were available for analysis for a threshold, as recommended by de Graaff et al. (2021).

The analysis was performed with R version 4.2.2 (R Core Team, 2022; Posit team, 2023) using the diagmeta test accuracy package (Rucker et al., 2022).

## Results

Initial searches identified 744 unique studies after eliminating duplicates. A further 2 studies were added by reviewers as new publications became available during the review process. Of the 746 publications screened based on title and abstract, 34 were identified as potentially relevant and 33 were successfully retrieved. Of these, 16 were excluded from the analysis. The most common reasons for exclusion were studies that did not assess the diagnostic accuracy using an appropriate methodology (n=6) and where the reference standard, to identify diagnostic status, was an unstructured clinician interview (n=6). See *Figure 1.* for PRISMA DTA flow diagram (Page et al., 2021) and see *Appendix D.* for screening forms.

*Figure 1. PRISMA Flow Chart*




There were 17 final papers included in the statistical analysis. Participants (n= 3349, range 83-629) identified as 53% female and 47% male. Numbers of those who identified as transgender (0.7%) and non-binary (0.3%) were only reported in one study (Boyd J.E. et al., 2022). The average age of participants fell most frequently within the ranges of 31-40 years (n=6) and 41-50 years (n=6). This was followed by 51-60 years (n=2), 21-30 (n=1) and 61+ (n=1). One study did not report average participant age, stating that participants were '18+'. It should be noted that around a third (30.8%) of studies (n=4) the demography of the overall sample was reported, rather than the subset used for signal detection analysis.

Studies varied in clinical setting with the most common being outpatient mental health clinics (n= 5; Boyd et al., 2022; Boysan et al., 2017; Kruger-Gottschalk et al., 2017; Levitt et al., 2021; Pereira-Lima et al., 2019; Roberts et al., 2021) and veteran samples (n=3; Bovin et al., 2016; Murphy et al., 2017; Price et al., 2016). Other clinical mental health settings included those for substance use disorder (n=1), survivors of an earthquake (n=1) and first responders (n=1). There were six studies screening potentially high-risk populations including those post- stroke (n=1), post- ICU care (n=1), trauma-exposed chronic pain and rehabilitation patients (n=1), primary care patients in an area of high HIV prevalence (n=1), those receiving HIV treatment (n=1) and female Filipino domestic workers working in China (n=1). Participants sampled in Hall et al.'s (2019) study of Filipino domestic workers reported a range of traumatic events – most commonly, natural disasters (38.2%), witnessing a death (35.1%) and physical assault (20.6%).

Participants came from a broad range of countries with multiple translations of the PCL-5 examined including German (n=2; Kruger- Gottschalk et al., 2017; Rosendahl et al., 2019), Turkish (n=1; Boysan et al., 2017), Spanish (n=1; Martinez- Levy et al., 2021), Danish (n=1; Hansen et al., 2023), Chinese (n=1; Jiang et al., 2023), Brazilian-Portuguese (n=1; Pereira-Lima et al., 2019), Shona (n=1; Verhey et al.,2018) and Tagalog (n=1; Hall et al., 2019) (see *Table 1.*). There were eight studies using the English language PCL-5. Most studies used the CAPS-5 (Weathers et al., 2013a) as a reference standard to establish PTSD diagnosis (n=12), with other semi-structured interviews used including the Diagnostic Assessment Research Tool DART (n=2) (McCabe et al., 2017), SCID-RV (First et al., 2015) (n=1), the Mini-International Neuropsychiatric Interview MINI and MINI-7 (Sheehan et al., 1998) (n=2).

Reference standard interviews were conducted by qualified professionals (n=7), doctoral students (n=3), graduates (n=6) and undergraduate researchers (n=1). In all studies interviewers were trained and supervised to administer the semi-structured interview tools by a Clinical Psychologist or Physician. Bovin et al. (2016) and Jiang et al. (2023) reported complete agreement in inter-rater reliability, Roberts et al. (2021) reported *ICC* = .87; Verhey et al. (2018) reported *K* = .91 and Hansen et al. (2023) reported no disagreement between raters. Hall et al. (2019) used only one rater; whilst all other publications did not report inter-rater reliability statistics (Boyd, et al., 2022; Boysan, et al., 2017; Kagee, et al., 2022; Kruger-Gottschalk, et al., 2017; Levitt, et al., 2021; Martinez-Levy, et al., 2021; Morrison, et al., 2021; Murphy et al., 2017; Pereira-Lima et al., 2019; Price, et al., 2016; Rosendahl et al., 2019).

Studies reported a range of recommended threshold values from ≥21 to ≥48; sensitivity and specificity values ranged from 0.5- 1, and from 0.35- 0.98, respectively; with AUC values ranging from 0.72- 0.99 (see *Table 1.* for optimal thresholds, AUC, sensitivity and specificity values). The VA recommended thresholds for PCL-5 probable diagnosis were supported by five studies which reported optimal thresholds between 31-33 (Bovin et al., 2016, 31-33; Kagee et al., 2022, 32; Kruger- Gottschalk et al., 2017, 33; Rosendahl et al., 2019, 33; Verhey et al., 2018, 33). One study found the diagnostic criteria rule to be of optimal diagnostic value (Hansen et al., 2023). This requires the endorsement of at least one symptom with a score of two or more, representing a severity rating of 'moderate', on an item from criteria B, one from criteria C and two symptoms each from criteria D and E.

There were three studies with AUC values >0.9 indicating high accuracy (Jiang et al.,2023; Kagee et al., 2022; Rosendahl et al., 2019), eight studies with AUC values between 0.8-0.9 (Bovin et al., 2016; Boyd et al., 2022; Boysan et al., 2017; Hall et al., 2019; Kruger-Gottschalk et al., 2017; Martinez- Levy et al., 2021; Pereira- Lima et al., 2019; Roberts et al., 2021) and five studies with AUC values 0.7 to 0.8 (Hansen et al., 2023; Levitt et al., 2021; Murphy et al., 2017; Price et al., 2016; Verhey et al.,2018), indicating moderate accuracy (Fischer et al., 2003). One study did not report AUC values (Morrison et al., 2021).

*Exclusions*

There were a small number of relevant studies addressing the diagnostic accuracy and psychometric evidence for the PCL-5 that were excluded from the analysis. This was based on studies not meeting inclusion criteria or not reporting sufficient information to make an eligibility judgement. Ho et al., (2017) was judged ineligible due to there being ambiguity in the timing between the reference standard and index test. Ashbaugh et al. (2016), Blevins et al. (2015) and Fung et al. (2019) calculated an optimum threshold by comparing prevalence established by the PCL-5 diagnostic criteria to the total score, rather than using a validated semi-structured interview as a reference standard. Buhagiar et al., (2019) applied a logistic regression model to predict PTSD diagnosis based on CAPS-5. Boysan et al., (2017) and Ibrahim et al., (2018) established diagnosis via clinician judgement rather than a validated reference standard. Geier et al., (2019) was initially included in the study at the full text screening stage, however due to consistencies in the sensitivity, specificity, PPV, NPV and prevalence data, 2x2 tables could not be calculated. We were unable to obtain data from the authors to allow us to recalculate these tables so the study was excluded from the analysis. One study was excluded from the analysis due participants being adolescents (Ghazali & Chen, 2018). Two studies were excluded due to using reference standards based on DSM-

IV criteria PTSD (Salleh et al., 2021; Wortmann et al., 2016). Although Wortmann et al. describe an adaptation process, this was not considered appropriate for the present review.

*Table 1. Included Study Characteristics*

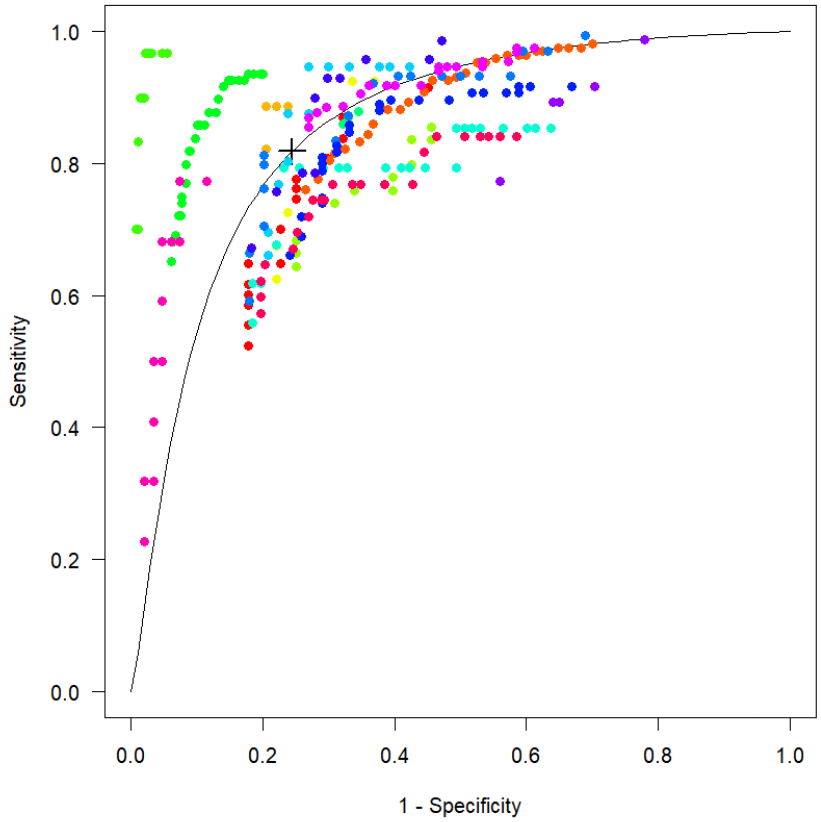
| Study | Setting / Sample | Country | Sample Size Total | Sample Size for Signal Detection Analysis | Gender Male/ Female | Mean Age / Standard Deviation | Reference Standard | Range of thresholds contributing to current analysis* | Optimal Reported Threshold (=/>) | Sensitivity | Specificity | PPV | NPV | AUC | Interviewer | Language of PCL-5 (Index Test) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bovin et al., 2016 | Veterans; Screening | USA | 140 | 104 | 89% / 11% | 53.39 (11.88) | CAPS-5 | 31-48 | 31-33 | 0.88 | 0.69 | 0.81 | 0.78 | 0.8 | Doctoral student | English |
| Boyd et al., 2022 | Outpatient Clinic; treatment seeking | Canada | 673 | 629 | 27.6% / 71.3% | 36.11 (13.16) | DART | 20.5-47.5 | 45 | 0.81 | 0.69 | 0.52 | 0.91 | 0.83 | Clinicians and graduate students | English |
| Boysan et al., 2017 | Outpatient Clinic; treatment seeking | Turkey | 90 | 90 | 55.56% / 44.44% | 29.01 (8.99) | CAPS-5 | 41.5- 47.5 | 47 | 0.90 | 0.80 | 0.69 | 0.94 | 0.87 | Clinician | Turkish |
| Hall et al., 2019 | Filipino women working as domestic workers; screening | China | 99 | 79 | 0% / 100% | 41.2 (8.8) | MINI | 22-29 | 25 | 0.89 | 0.73 | 0.52 | 0.96 | 0.87 | Clinician | Tagalog (Filipino) |
| Hansen et al., 2023 | Chronic pain and rehabilitation patients; screening | Denmark | 84 | 84 | Pain Centre: 55.3% / 44.7% Rehab: 30.4% / 69.6% | Pain Centre: 44.8 (11.1) Rehab: 35.9% (11.0) | CAPS-5 | 26-38 | Diagnostic criteria | 0.75 | 0.73 | 0.81 | 0.65 | 0.79 | Graduate Students | Danish |
| Jiang et al., 2023 | Outpatient stroke clinic; screening | China | 348 | 348 | 72.99% / 27.01% | 55.41 (10.58) | CAPS-5 | 31.5-45.5 | 37 | 1 | 0.98 | 0.67 | 1 | 0.99 | Masters and Doctoral students | Chinese |
| Kagee et al., 2022 | HIV Clinic; screening | South Africa | 388 | 388 | 80.4% / 19.6% | NR | SCID-RV | 20.5-47.5 | 32 | 0.88 | 0.88 | 0.56 | 0.98 | 0.94 | Masters students | English |
| Kruger- Gottschalk et al., 2017 | Outpatient Clinic; treatment seeking | Germany | 341 | 341 | 43.4% / 56.3% | 37.54 (12.16) | CAPS-5 | 31-33 | 33 | 0.86 | 0.68 | 0.81 | 0.75 | 0.85 | Clinicians and graduates | German |
| Levitt et al., 2021 | Substance use disorder; treatment seeking | Canada | 99 | 99 | 68% / 32% | 41.7 (11.39) | DART | 21.5-47.5 | 42 | 0.81 | 0.51 | 0.24 | 0.93 | 0.79 | Clinicians and Doctoral students | English |
| Martinez- Levy et al., 2021 | Outpatient Clinic; post-earthquake; treatment seeking | Mexico | 68 | 91 (repeated timepoints) | 76.5% / 23.5% | 43.03 (13.43) | CAPS-5 | 21-35 | 27 | 0.96 | 0.73 | 0.60 | 0.98 | 0.88 | Psychiatrists | Spanish |
| Morrison et al., 2021 | First responders; treatment seeking | USA | 133 | 133 | 88.8% / 11.2% | 40.87 (8.19) | CAPS-5 | 22-48 | 41 | 0.82 | 0.80 | 0.87 | 0.73 | NR | Masters and doctoral students | English |
| Murphy et al., 2017 | Veteran; treatment seeking | UK | 242 | 242 | 97.9% / 3% | 44.0 (12.2) | CAPS-5 | 21-48 | 34 | 0.89 | 0.63 | 0.89 | 0.63 | 0.79 | Clinicians | English |
| Pereira- Lima et al., 2019 | Outpatient Clinic; screening | Brazil | 85 | 85 | 35.3% / 64.7% | 46 (13.2) | CAPS-5 | 21-45 | 36 | 0.94 | 0.71 | 0.68 | 0.95 | 0.86 | Clinicians | Brazilian-Portuguese |
| Price et al., 2016 | Veteran; treatment seeking | USA | 133 | 133 | 78.7% / 21.3% | 50.20 (14.91) | MINI7 | 30-45 | 38 | 0.90 | 0.35 | 0.38 | 0.89 | 0.72 | Clinician and doctoral student | English |
| Roberts et al., 2021 | Outpatient Clinic | UK | 273 | 216 | 50.9% / 49.1% | 47.5 (12.7) | CAPS-5 | 25.5-44.6 | 43-44 | 43: 0.89 44: 0.88 | 43: 0.71 44: 0.72 | 43: 0.85 44: 0.86 | 43: 0.77 44: 0.76 | 0.86 | Clinicians and graduate assistants | English |
| Rosendahl et al., 2019 | Post-ICU patients; screening | Germany | 83 | 83 | 60.2% / 39.8% | 64 (NR) | CAPS-5 | 20.5-47 | 33 | 0.5 | 0.96 | 0.63 | 0.93 | 0.94 | Medical student | German |
| Verhey et al.,2018 | Primary care patients in high prevalence HIV region; screening | Zimbabwe | 204 | 204 | HIV+ 20.9% / 79.1% HIV - 9% / 91% | 34 (NR) | CAPS-5 | 21-45 | 33 | 0.75 | 0.71 | 0.46 | 0.89 | 0.78 | Clinicians | Shona |

*All thresholds within range may not be reported by studies, and therefore may not contribute to the current analysis **NR= Not Reported

*Analysis*

Seventeen studies were analysed using the multiple thresholds mixed effects model (Steinhauser et al., 2016). Studies contributed between 3 and 28 data points for PCL-5 thresholds 21 to 48, there were 274 data points. The statistical data extraction form and raw 2x2 data can be seen in Appendix E and F, respectively.

*Figure 2. SROC of all thresholds (pooled and by study)*




The model produced an optimal PCL-5 threshold of 35.628 with pooled sensitivity of 0.8182 (95% CI 0.7502- 0.8709) and specificity of 0.7559 (95% CI 0.6407 - 0. 8432). This was identified by a Youden's Index (J) value of 0.5741. This result suggests an optimum practical threshold of 36. The pooled AUC (95% CI) was 0.8534 (sensitivity given specificity 0.8162; 0.8882; specificity given sensitivity 0.7758; 0.9006) which suggests a moderate overall diagnostic accuracy (Fischer et al., 2003).

*Table 2* shows all pooled sensitivity, specificity values for each threshold (95% confidence intervals), Youden's index (J) combining both values, with number of studies and participants contributing to each data point. Values are shown as whole numbers. Results are visually

represented in *Figure 2.* in SROC space (summary receiver operator curve), with pooled and study-specific sensitivity and specificity values. The optimal threshold is marked by 'X'.

*Table 2. Full sample pooled sensitivity and specificity*

| Threshold | Contributing Studies (n=) | Contributing Participants (n=) | Sensitivity (95% CI) | Specificity (95% CI) | Youden's Index (J) |
|---|---|---|---|---|---|
| 21 | 7 | 1722 | 0.94 (0.93-0.96) | 0.52 (0.43-0.6) | 0.4615 |
| 22 | 9 | 1948 | 0.94 (0.92-0.95) | 0.54 (0.45-0.62) | 0.4746 |
| 23 | 9 | 1948 | 0.93 (0.91-0.95) | 0.55 (0.46-0.64) | 0.4872 |
| 24 | 7 | 1732 | 0.93 (0.9-0.95) | 0.57 (0.48-0.66) | 0.4992 |
| 25 | 7 | 1732 | 0.92 (0.89-0.94) | 0.59 (0.49-0.68) | 0.5105 |
| 26 | 11 | 2248 | 0.91 (0.89-0.94) | 0.61 (0.51-0.7) | 0.5211 |
| 27 | 9 | 2032 | 0.91 (0.88-0.93) | 0.62 (0.52-0.72) | 0.5310 |
| 28 | 13 | 2437 | 0.9 (0.86-0.93) | 0.64 (0.54-0.73) | 0.5399 |
| 29 | 10 | 2140 | 0.89 (0.85-0.92) | 0.66 (0.55-0.75) | 0.5480 |
| 30 | 10 | 2190 | 0.88 (0.84-0.91) | 0.67 (0.56-0.77) | 0.5551 |
| 31 | 11 | 2531 | 0.87 (0.83-0.91) | 0.69 (0.58-0.78) | 0.5611 |
| 32 | 13 | 2621 | 0.86 (0.81-0.9) | 0.7 (0.59-0.8) | 0.5660 |
| 33 | 12 | 2405 | 0.85 (0.8-0.89) | 0.72 (0.61-0.81) | 0.5698 |
| 34 | 12 | 2623 | 0.84 (0.78-0.88) | 0.73 (0.62-0.82) | 0.5725 |
| 35 | 13 | 2740 | 0.83 (0.76-0.88) | 0.75 (0.63-0.84) | 0.5739 |
| **35.628** Optimal threshold | | | **0.82 (0.75-0.87)** | **0.76 (0.64-0.84)** | **0.5741** |
| 36 | 10 | 2328 | 0.81 (0.74-0.87) | 0.76 (0.65-0.85) | 0.5740 |
| 37 | 12 | 2615 | 0.8 (0.72-0.86) | 0.77 (0.66-0.86) | 0.5729 |
| 38 | 9 | 2133 | 0.78 (0.7-0.85) | 0.79 (0.67-0.87) | 0.5705 |
| 39 | 8 | 2159 | 0.77 (0.68-0.84) | 0.8 (0.68-0.88) | 0.5669 |
| 40 | 9 | 2148 | 0.75 (0.66-0.83) | 0.81 (0.7-0.89) | 0.5620 |
| 41 | 11 | 2531 | 0.74 (0.64-0.81) | 0.82 (0.71-0.9) | 0.5558 |
| 42 | 9 | 2057 | 0.72 (0.61-0.8) | 0.83 (0.72-0.9) | 0.5484 |
| 43 | 8 | 2145 | 0.7 (0.59-0.79) | 0.84 (0.73-0.91) | 0.5397 |
| 44 | 11 | 2536 | 0.68 (0.57-0.78) | 0.85 (0.74-0.92) | 0.5300 |
| 45 | 11 | 2581 | 0.66 (0.54-0.76) | 0.86 (0.75-0.92) | 0.5191 |
| 46 | 7 | 1943 | 0.64 (0.52-0.75) | 0.87 (0.76-0.93) | 0.5072 |
| 47 | 8 | 1768 | 0.62 (0.49-0.73) | 0.88 (0.77-0.94) | 0.4944 |
| 48 | 7 | 1685 | 0.6 (0.47-0.72) | 0.88 (0.78-0.94) | 0.4806 |

Sub-group analyses were performed in studies recruiting a veteran sample (n=3) and an outpatient mental health / substance misuse sample (n=6). Within this group there was one treatment- seeking substance-misuse sample (Levitt et al., 2021). The intention was to capture a cohort of participants who were seeking support for chronic mental health difficulties.

The veteran sub-group (Bovin et al., 2016; Murphy et al., 2017; Price et al., 2016) produced an optimal PCL-5 threshold of 43.749 with a pooled sensitivity of 0.7612 (95% CI, 0.6378-0.8523] and specificity of 0.6613 (95% CI, 0.3824 - 0.8603). Youden's Index (J) was 0.4225. This result suggests an optimum practical threshold of 44.

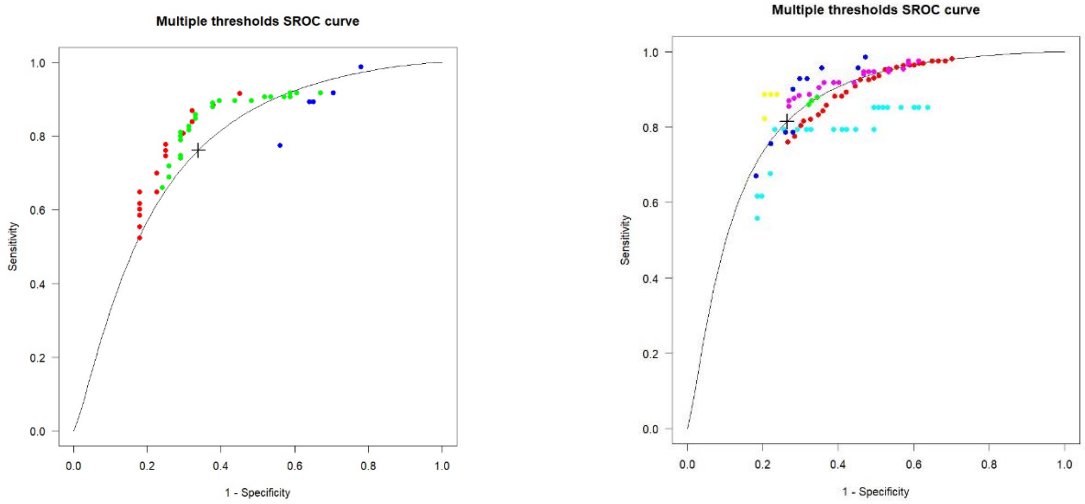
The pooled AUC (95% CI) was 0.7674 (95% CI, sensitivity given specificity 0.6954-0.8393; specificity given sensitivity 0.5084-0.8823) which suggests a moderate overall diagnostic accuracy (Fischer et al., 2003).

*Table 3* shows pooled sensitivity, specificity values for each threshold (95% confidence intervals), Youden's index (J) combining both values, with number of studies and participants contributing to a section of data points around the optimum in the veteran analysis. Values are shown as whole numbers. Results are visually represented in *Figure 3 and 4.* in SROC space (summary receiver operator curve), with pooled and study-specific sensitivity and specificity values. The optimal threshold is marked by 'X'.

*Table 3. Veteran samples pooled sensitivity and specificity*

| Threshold | Contributing Studies (n=) | Contributing Participants (n=) | Sensitivity (95% CI) | Specificity (95% CI) | Youden's Index (J) |
|---|---|---|---|---|---|
| 41 | 2 | 346 | 0.8 (0.69-0.87) | 0.62 (0.36-0.83) | 0.4197 |
| 42 | 2 | 346 | 0.78 (0.67-0.87) | 0.64 (0.37-0.84) | 0.4214 |
| 43 | 2 | 346 | 0.77 (0.65-0.86) | 0.65 (0.38-0.85) | 0.4223 |
| 43.749 Optimum Threshold | | | 0.76 (0.64- 0.85) | 0.66 (0.38 - 0.86) | 0.4225 |
| 44 | 2 | 364 | 0.76 (0.63-0.85) | 0.66 (0.38-0.86) | 0.4225 |
| 45 | 3 | 476 | 0.74 (0.61-0.84) | 0.68 (0.39-0.87) | 0.4219 |
| 46 | 2 | 364 | 0.73 (0.59-0.83) | 0.69 (0.4-0.88) | 0.4206 |

*Figure 3 & 4. SROC for studies of veteran samples (left) and outpatient mental health / substance misuse (right)*




The outpatient mental health / substance misuse sample (Boyd et al., 2022; Boysan et al., 2017; Kruger-Gottschalk et al., 2017; Levitt et al., 2021; Pereira-Lima et al., 2019; Roberts et al., 2021) produced an optimal PCL-5 threshold of 41.668 with a pooled sensitivity of 0.8147 (CI 95% 0.7193- 0.8829) and specificity of 0.7359 (CI 95% 0.6741- 0.7897). Youden's Index (J) was 0.5505. This result suggests an optimum practical threshold of 42. It should be noted that the sample recruited by Roberts et al. (2021) was 18.9% veterans (n= 67).

Table 4 shows pooled sensitivity, specificity values for each threshold (95% confidence intervals), Youden's index (J) combining both values, with number of studies and participants contributing to data points around the optimum. Values are shown as whole numbers. Results are visually represented in *Figure 2.* in SROC space (summary receiver operator curve), with pooled and study-specific sensitivity and specificity values. The optimal threshold is marked by 'X'.

The pooled AUC (95% CI) was 0.8397 (sensitivity given specificity 0.7889- 0.8861; specificity given sensitivity 0.8006- 0.8706) which suggests a moderate overall diagnostic accuracy (Fischer et al., 2003).

*Table 4. Outpatient mental health / substance misuse sample pooled sensitivity and specificity*

| Threshold | Contributing Studies (n=) | Contributing Participants (n=) | Sensitivity (95% CI) | Specificity (95% CI) | Youden's Index (J) |
|---|---|---|---|---|---|
| 39 | 3 | 944 | 0.85 (0.78-0.91) | 0.69 (0.63-0.75) | 0.5453 |
| 40 | 3 | 944 | 0.84 (0.76-0.9) | 0.71 (0.65-0.77) | 0.5485 |
| 41 | 4 | 1055 | 0.82 (0.73-0.89) | 0.73 (0.66-0.78) | 0.5502 |
| 41.668 Optimum Threshold | | | 0.82 (0.72-0.88) | . 0.74 (0.67- 0.79) | 0.5505 |
| 42 | 5 | 1119 | 0.81 (0.71-0.88) | 0.74 (0.68-0.79) | 0.5505 |
| 43 | 3 | 930 | 0.79 (0.69-0.87) | 0.76 (0.69-0.81) | 0.5492 |
| 44 | 4 | 1034 | 0.78 (0.66-0.86) | 0.77 (0.71-0.82) | 0.5464 |

*Quality Assessments*

QUADAS-2 item ratings provide a guide to risk of bias and applicability concerns for studies included in the analysis (see *Table 5.* for ratings). Judgements were made in relation to the review question, rather than on the individual study. Eight studies were judged to have low risk across all domains (Bovin et al., 2016; Boysan et al., 2017; Hall et al., 2019; Levitt et al., 2021; Murphy et al., 2017; Pereira- Lima et al., 2019; Roberts et al., 2021; Verhey et al.,2018), five studies were judged to have items with unclear risk (Boyd et al., 2022; Kagee et al., 2022; Kruger- Gottschalk et al., 2017; Morrison et al., 2021; Price et al., 2016) and four studies were judged to have high risk items (Hansen et al., 2023; Jiang et al., 2023; Martinez- Levy et al., 2021; Rosendahl et al., 2019). One study was judged to be high risk on four items (Martinez- Levy et al., 2021), two studies were judged to be high risk on three domains (Jiang et al., 2023; Rosendahl et al., 2019) and one study was judged high risk on two domains (Hansen et al., 2023).

Five studies (Boyd, et al., 2022; Kagee, et al., 2022; Kruger-Gottschalk, et al., 2017; Morrison, et al., 2021; Price, et al., 2016) were judged to have unclear risk of bias due to not reporting whether the index and reference tests were interpreted blind. In one case, both tests were administered via telephone, suggesting tests could not be interpreted blind and we judged this study to be high risk (Rosendahl et al., 2019).

Concerns about risk of bias in patient selection included: recruiting patients with known PTSD diagnoses (Hansen et al., 2023); recruiting companions of participants who may be less likely to be symptomatic (Martinez-Levy, et al., 2021); or where there was a high drop-out rate meaning a lower prevalence of PTSD (Rosendahl et al., 2019). Given the broad scope of the review, applicability concerns related to studies that only included those with

specific types of potentially traumatic events, such as stroke (Jiang et al., 2023), traffic or work-related (Hansen et al., 2023) or earthquake-survivors (Martinez-Levy et al., 2021). Furthermore, in two studies, administration of index or reference test attracted a high risk of bias and applicability where participants were instructed to only report symptoms related to these specific traumas (Jiang et al., 2023; Martinez-Levy et al., 2021).

It is noteworthy that high risk of bias was not reported on any studies from the veteran or outpatient subgroup analyses.

There were no high or unclear flow and timing ratings, this is largely due to reviewers applying screening criteria requiring a gap of less than 30 days between index and reference tests to be included in the review. Furthermore, a flow and timing signalling question assessing whether all participants were included in the analysis was used - in all cases appropriate exclusions were applied.

*Table 5. QUADAS-2 Ratings*

| Study | RISK OF BIAS | | | | APPLICABILITY CONCERNS | | |
|---|---|---|---|---|---|---|---|
| | PATIENT SELECTION | INDEX TEST | REFERENCE STANDARD | FLOW AND TIMING | PATIENT SELECTION | INDEX TEST | REFERENCE STANDARD |
| Bovin et al., 2016 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Boyd et al., 2022 | ☺ | ? | ? | ☺ | ☺ | ☺ | ☺ |
| Boysan et al., 2017 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Hall et al., 2019 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Hansen et al., 2023 | ☹ | ☺ | ☺ | ☺ | ☹ | ☺ | ☺ |
| Jiang et al., 2023 | ☺ | ☺ | ☺ | ☺ | ☹ | ☹ | ☹ |
| Kagee et al., 2022 | ☺ | ? | ? | ☺ | ☺ | ☺ | ☺ |
| Kruger- Gottschalk et al., 2017 | ☺ | ? | ? | ☺ | ☺ | ☺ | ☺ |
| Levitt et al., 2021 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Martinez- Levy et al., 2021 | ☹ | ☺ | ☺ | ☺ | ☹ | ☹ | ☹ |
| Morrison et al., 2021 | ☺ | ? | ? | ☺ | ☺ | ☺ | ☺ |
| Murphy et al., 2017 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Pereira- Lima et al., 2019 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Price et al., 2016 | ☺ | ? | ? | ☺ | ☺ | ☺ | ☺ |
| Roberts et al., 2021 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Rosendahl et al., 2019 | ☹ | ☹ | ☹ | ☺ | ☺ | ☺ | ☺ |
| Verhey et al.,2018 | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |

☺ Low Risk ☹ High Risk ? Unclear Risk

## Discussion

Self-report measures, such as the PCL-5, provide an accessible and resource efficient means of identifying mental health problems, which is of particular interest in settings with low- resource and high- demand (Kagee et al., 2013). To our knowledge this is the first systematic review to examine the diagnostic accuracy of this measure. Reviewers followed Cochrane Collaboration guidelines for diagnostic accuracy studies.

Reviewers sought to evaluate the recommended diagnostic threshold of 31-33 applied widely in research studies and clinical practice (Weathers et al., 2013; Forkus, et al., 2021; National Collaborating Centre for Mental Health, 2023). Identifying an accurate threshold, or cut-off score, by which a probable diagnosis can be made aids researchers and clinicians in the identification of a probable clinical condition, measuring symptom severity, and evaluating interventions.

Seventeen studies were identified as eligible for meta-analysis (n= 3349, range 83-629). Settings included outpatient mental health and substance- misuse clinics (n = 6), veteran mental health clinics (n = 3) and screening high risk populations, including first responders, survivors of natural disasters, and specific health populations (e.g. stroke survivors, HIV patients and those post-ICU admission). Participants came from a broad range of countries with eight translations of the PCL-5 examined. There were range of reported thresholds ranging from 21 and 48 (*see Table 1.* for study characteristics, optimal thresholds, AUC, sensitivity and specificity values). Only five of the seventeen studies endorsed thresholds within the 31-33 range.

A multiple thresholds mixed effects model (Steinhauser et al., 2016) was applied to pool sensitivity and specificity data to produce an optimal threshold for probable diagnosis. Using data from all included studies the model produced an optimal PCL-5 threshold of 35.628. This result suggested an optimum threshold of 36, above the current recommended threshold of 31-33. This finding contrasts with the conclusions of recent systematic review of the psychometric evidence of the PCL-5 (Forkus et al., 2023), however this review did not undertake a meta-analytic approach in coming to this conclusion.

There were a wide range of optimal thresholds reported across studies (21-48), there is existing evidence that specific settings and populations may require different thresholds (e.g. PCL, McDonald & Calhoun, 2010). Subgroup analyses were performed on studies with veteran and outpatient clinical samples, both groups also reported varying optimal

thresholds (31-38 and 33-47 respectively). The veteran sub-group produced an optimal PCL-5 threshold of 44 (43.749) with a pooled sensitivity of 76% and specificity of 66%. The outpatient mental health / substance misuse sample produced an optimal PCL-5 threshold of 42 (41.668) with a pooled sensitivity of 82% and specificity of 74%. Studies included in subgroup analyses attracted mostly low risk of bias and applicability concerns, with high risk of bias associated to studies screening high risk populations. The overall diagnostic accuracy of the PCL-5 as described by AUC statistics suggest moderate accuracy across all studies and subgroups, with an overall AUC of 0.85; veteran AUC of 0.77; and outpatient AUC of 0.84. Resulting thresholds are well above the threshold range recommend by the National Centre for PTSD (VA) and NHS Talking Therapies for Anxiety and Depression (formerly IAPT). These analyses therefore suggest higher thresholds may advisable.

Higher thresholds in the veteran and outpatient mental health / substance misuse samples were consistent with findings that scores on the PCL-5 are comparatively higher than those on the CAPS-5, despite similar questions and scoring (Kramer et al., 2023). These disparities have been found in treatment- seeking veterans and have also been found post-treatment (Resick et al., 2023). This may be an important consideration for clinicians and researchers when using PCL-5 scores to examine symptom severity, infer diagnostic status and evaluate treatments.

It is notable that compared to the overall pooled threshold of 36, and the sub-group analyses thresholds, the studies examining high-risk samples tended to favour lower thresholds (Hall et al., 2019, 25; Martinez- Levy et al., 2021, 27; Rosendahl et al., 2019, 33; Verhey et al.,2018, 33; Kagee et al., 2022, 32). The heterogeneity of samples from screening studies meant that meta-analysis was not feasible, however there may be merit in the use of lower thresholds for screening and epidemiological studies.

These optimum thresholds were calculated taking into account for the heterogeneity present between studies and accounting for the dependent relationship between sensitivity and specificity values. Only studies that used a validated clinical interview as a reference test (e.g. CAPS-5, MINI) and reported the administration of the index and reference tests took place within 30 days were included, which represents a strength of this review. Administration of the PCL-5 and the reference standard was most often completed on the same day. This is the first review to meta-analyse multiple thresholds for the PCL-5, and made use of both reported and unreported data. Where insufficient data was reported for the calculation of 2x2 tables, authors were contacted and further data was provided for five studies.

Between study differences may also be due to methodological, recruitment and test administration factors. As a result, quality appraisals based on QUADAS-2 criteria were performed to assess for risk of bias and applicability of the included studies which is another strength of this review (Whiting et al., 2011; see *Table 5.*). Eight studies were judged to have low risk across all domains, five were judged to have items with unclear risk and four studies were judged to have high risk items. The most common domains that were judged to be high risk related to bias in participant selection which may have impacted estimates of sensitivity and specificity (e.g. by under or overestimating prevalence rates). Risk of wider applicability was most often due to studies examining specific types of traumatic event (e.g. stroke-related trauma).

Selecting appropriate thresholds for probable diagnosis is a balance between the sensitivity and specificity desired by a clinical pathway or study design (Bossuyt et al., 2022). Reviewers propose that whilst the estimated optimum thresholds are based on the best available psychometric evidence, no one threshold can be said to be superior for all applications. There was a broad range of recommended thresholds, even in studies in similar settings (*See Table. 1.*).

A strength of this review was the wide range of prevalence, severity and possible co-morbidity levels within studies. However including multiple studies not examining or reporting comorbidity or severity levels may be considered a limitation. Studies varied in the number of thresholds contributing to the analysis. Of seventeen studies, the range of total studies contributing to individual thresholds was 7-13, with a range of contributing participants from 1685-2740. The number of contributing data points for sensitivity and specificity values ranged from 1 (Price et al., 2016) to 32 (Murphy et al., 2017). This is an important limitation – if all included studies reported a wider range of thresholds, the optimum thresholds would likely be different. This limitation is particularly relevant for the subgroup analyses, where there were fewer contributing studies. The veteran subgroup had only one data point with three contributing studies, with other data points only having two contributing studies (N = 346- 476), testing robustness of the statistical procedure. The outpatient mental health / substance misuse sub group consisted of data points with three to four contributing studies (N= 930- 1119). The approach used by de Graaff et al. (2021) required at least three comparable studies for analysis. Although his rule was applied, many individual data points in the sub group analyses did not have 3 study samples to contribute. These results should be interpreted with caution.

Within the veteran sub-group, one study (Bovin et al., 2016) used a sample of veterans seeking care at a health clinic, whereas two were help seeking mental health veterans. Like the veteran subgroup, the outpatient subgroup analysis produced a higher optimum threshold. Roberts et al. (2021) suggest that clinical groups may produce higher threshold due to more severity, comorbidity and increased overall distress (i.e. vs a screening sample), rather than specifically due to more severe PTSD symptoms. This may have implications for the performance of other self-report tools in clinical versus non-clinical samples. Results on this review should be considered in the context of between study sample heterogeneity, varying optimum thresholds between studies and varying optimal thresholds between sub-groups.

The inclusion of studies using multiple translations of both the PCL-5 and reference standard tests is an advantage for the potential applicability of the results. This overall threshold may be an optimal choice where a large or diverse sample is being recruited or where specific thresholds are not available for a particular area of research or clinical practice. However there is a possible risk in applying the overall optimum threshold to a highly specialised setting. Further psychometric evidence for specific languages, populations and settings would aid future reviews. Providing setting- specific guidance and expanding the overall pool of evidence would strengthen a future review.

In a clinical context, although self-report measures are valuable tools, they do not replace the necessity of robust clinician assessment or structured clinical interviews in clinical decision making and treatment planning. Clinical interviews used by studies in the review had varying psychometric evidence; for example, the CAPS-5 is considered the gold standard tool for PTSD assessment (Weathers et al., 2013a; US Department of Veterans Affairs, 2023), whilst the DART has less psychometric evidence (McCabe, 2017; Schneider et al., 2022). Furthermore, the present review was limited to validated clinical interview tools, but excluded validated self-report measures. Although this may be considered methodologically superior, it did limit the scope of the review.

QUADAS-2 risk of bias and applicability assessments were completed independently by a second reviewer, with any disagreements resolved by a third reviewer. However statistical data extraction (for 2x2 data) was completed by one reviewer (AC). Procedures were undertaken to check the validity of these calculations, but they were not independently checked (E.g. following the calculation of 2x2 data from sensitivity, specificity, prevalence and sample numbers, the resulting positive predictive and negative predictive rates were compared to data within the study).

Where reported, the internal consistency and test–retest reliability of self-report measures did contribute to QUADAS-2 judgements, but were not reported in this review.

## Conclusions/ Recommendations

Based on a multiple thresholds meta-analysis of studies assessing the diagnostic accuracy of the PCL-5, an optimal threshold for probable PTSD diagnosis of 36 is recommended. Subgroup analyses based on a limited number of studies suggest a threshold of 42 for outpatient settings and 44 for veteran settings. These novel thresholds are based on the available psychometric evidence which has increased substantially since the original recommendations were made (Weathers et al., 2013; https://www.ptsd.va.gov). It is possible that by using existing lower thresholds, researchers and clinicians may be prioritising sensitivity over specificity. Researchers and clinicians should consider adjusting thresholds used for probable diagnosis of PTSD – this will have implications for the accuracy of prevalence estimates, appropriate treatment planning and the robustness of treatment evaluation**.** Strengths of this review include a preregistered protocol, stringent inclusion criteria, independent quality assessment procedures, data checking processes and sub group analysis. Selecting appropriate thresholds for clinical caseness or probable diagnosis is dependent on the needs of the clinical pathway or research question for which a self-report measure is applied. PCL-5 scores should not be used as a sole basis for clinical decision making. Self- report measures should be followed up with a validated structured interview or further clinical assessment.

## Footnotes

*Divergence from Protocol*

The methodology of the review was updated since registration. Assessing adherence to STARD criteria (Bossuyt et al., 2015) was dropped from the review as QUADAS-2 criteria (Whiting et al., 2011) was judged to be a sufficient quality appraisal tool. Data synthesis plans were updated with the adoption of a multiple-thresholds model (Steinhauser et al., 2016) thus widening the scope of the review to all reported thresholds. Inclusion criteria were updated to exclude studies that used self-report measures as a reference standard, in favour of validated structured clinical interviews. Furthermore, there were changes to the search strategy to widen the pool of studies identified.

*Declarations of interest*

One reviewer (NR) is an author of an included study (Roberts et al., 2021).

*Contributions*

Adam Joshua Cann - Conceptualization; data curation; formal analysis; methodology
Dr. Cerith Waters – Supervision
Professor Neil Roberts – Supervision
Jenna Evans – Data curation (repeating paper sort and QUADAS-2 ratings)

*Funding*

The study is hosted by the National Centre for Mental Health (NCMH), a Health and Care Research Wales and Welsh Government funded research collaboration between Cardiff, Swansea, and Bangor Universities. Study completed within South Wales Doctoral Programme in Clinical Psychology, School of Psychology, Cardiff University.

**References**

American Psychiatric Association. *Diagnostic and statistical manual of mental disorders 5th ed.* Arlington, VA: American Psychiatric Association; 2013.

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders (4th ed.).*

Ashbaugh A.R., Houle-Johnson S., Herbert C., El-Hage W., & Brunet A. (2016). Psychometric validation of the English and French versions of the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5). PLoS ONE, 11(10), Article 10. https://doi.org/10.1371/journal.pone.0161645

Blevins C.A., Weathers F.W., Davis M.T., Witte T.K., & Domino J.L. (2015). The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Development and Initial Psychometric Evaluation. Journal of Traumatic Stress, 28(6), Article 6. https://doi.org/10.1002/jts.22059

Bossuyt, P. M., Reitsma, J. B., Bruns, D. E., Gatsonis, C. A., Glasziou, P. P., Irwig, L., Lijmer, J. G., Moher, D., Rennie, D., Vet, H. C. W. de, Kressel, H. Y., Rifai, N., Golub, R. M., Altman, D. G., Hooft, L., Korevaar, D. A., & Cohen, J. F. (2015). STARD 2015: An updated list of essential items for reporting diagnostic accuracy studies. BMJ, 351, h5527. https://doi.org/10.1136/bmj.h5527

Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2016). Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition (PCL-5) in veterans. Psychological Assessment, 28, 1379–1391. https://doi.org/10.1037/pas0000254

Bossuyt PM. Chapter 3: Understanding the design of test accuracy studies. Draft version (4 October 2022) for inclusion in: Deeks JJ, Bossuyt PM, Leeflang MM, Takwoingi Y, editor(s). Cochrane Handbook for Systematic Reviews of Diagnostic Test Accuracy Version 2. London: Cochrane. https://training.cochrane.org/handbook-diagnostic-test-accuracy

Boysan M., Ozdemir P.G., Ozdemir O., Selvi Y., Yilmaz E., & Kaya N. (2017). Psychometric properties of the Turkish version of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (PCL-5). Psychiatry and Clinical Psychopharmacology, 27(3), Article 3. https://doi.org/10.1080/24750573.2017.1342769

Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2016). Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition (PCL-5) in veterans. Psychological Assessment, 28(11), Article 11. https://doi.org/10.1037/pas0000254

Boyd J.E., Cameron D.H., Shnaider P., McCabe R.E., & Rowa K. (2022). Sensitivity and specificity of the Posttraumatic Stress Disorder Checklist for DSM-5 in a Canadian psychiatric outpatient sample. Journal of Traumatic Stress, 35(2), Article 2. https://doi.org/10.1002/jts.22753

Boysan M., Ozdemir P.G., Ozdemir O., Selvi Y., Yilmaz E., & Kaya N. (2017). Psychometric properties of the Turkish version of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (PCL-5). Psychiatry and Clinical Psychopharmacology, 27(3), Article 3. https://doi.org/10.1080/24750573.2017.1342769

Boysan M., Ozdemir P.G., Yilmaz E., Selvi Y., Ozdemir O., & Kefeli M.C. (2017). Psychometric properties of the Turkish version of the clinician-administered ptsd scale for diagnostic and statistical manual of mental disorders, fifth edition (Turkish CAPS-5). Psychiatry and Clinical Psychopharmacology, 27(2), Article 2. https://doi.org/10.1080/24750573.2017.1326746

Buhagiar, R., Dimech, C., & Felice, E. (2019). The Validation of the Post-Traumatic Checklist for DSM-V (PCL-5) in the Maltese Perinatal Population. JOURNAL OF REPRODUCTIVE AND INFANT PSYCHOLOGY, 37(5), Article 5.

Carvalho T., da Motta C., & Pinto-Gouveia J. (2020). Portuguese version of the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Comparison of latent models and other psychometric analyses. Journal of Clinical Psychology, 76(7), Article 7. https://doi.org/10.1002/jclp.22930

Charlson, F., van Ommeren, M., Flaxman, A., Cornett, J., Whiteford, H., & Saxena, S. (2019). New WHO prevalence estimates of mental disorders in conflict settings: A

systematic review and meta-analysis. Lancet (London, England), 394(10194), 240–248. https://doi.org/10.1016/S0140-6736(19)30934-1

Cloitre, M., Shevlin, M., Brewin, C. R., Bisson, J. I., Roberts, N. P., Maercker, A., Karatzias, T., & Hyland, P. (2018). The International Trauma Questionnaire: Development of a self-report measure of ICD-11 PTSD and complex PTSD. *Acta Psychiatrica Scandinavica*, *138*(6), 536–546. https://doi.org/10.1111/acps.12956

Davidson, J. R. T., Book, S. W., Colket, J. T., Tupler, L. A., Roth, S., David, D., Hertzberg, M., Mellman, T., Beckham, J. C., Smith, R., Davison, R. M., Katz, R., & Feldman, M. (1997). Assessment of a new self-rating scale for post-traumatic stress disorder. Psychological Medicine, 27, 153-160.

Davidson, J. R., Tharwani, H. M., Connor, K. M. (2002). Davidson Trauma Scale (DTS): Normative scores in the general population and effect sizes in placebo-controlled SSRI trials. Depression and Anxiety, 15, 75-78.

de Graaff, A. M., Cuijpers, P., Leeflang, M., Sferra, I., Uppendahl, J. R., de Vries, R., & Sijbrandij, M. (2021). A systematic review and meta-analysis of diagnostic test accuracy studies of self-report screening instruments for common mental disorders in Arabic-speaking adults. *Global Mental Health* (Cambridge, England), 8, e43. https://doi.org/10.1017/gmh.2021.39

Ennis N., Anton M., Bravoco O., Ridings L., Hunt J., deRoon-Cassini T.A., Davidson T., & Ruggiero K. (2021). Prediction of Posttraumatic Stress and Depression One-Month Post-Injury: A Comparison of Two Screening Instruments. Health Psychology, 40(10), Article 10. https://doi.org/10.1037/hea0001114

Fan, J., Upadhye, S., & Worster, A. (2006). Understanding receiver operating characteristic (ROC) curves. Canadian Journal of Emergency Medicine, 8(1), 19–20. https://doi.org/10.1017/S1481803500013336

Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. Psychological Assessment, 9(4), 445–451. https://doi.org/10.1037/1040-3590.9.4.445

Ferrie O., Richardson T., Smart T., & Ellis-Nee C. (2022). A validation of the PCL-5 questionnaire for PTSD in primary and secondary care. Psychological Trauma : Theory, Research, Practice and Policy, (Ferrie, Richardson) School of Psychology, Article (Ferrie, Richardson) School of Psychology. https://doi.org/10.1037/tra0001354

First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015). Structured clinical interview for DSM-5—Research version (SCID-5 for DSM-5, research version; SCID-5-RV). Arlington, VA: American Psychiatric Association, 1–94. https://doi.org/10.1007/springerreference_184632

Fischer, J. E., Bachmann, L. M., & Jaeschke, R. (2003). A readers' guide to the interpretation of diagnostic test properties: Clinical example of sepsis. Intensive Care Medicine, 29(7), 1043–1051. https://doi.org/10.1007/s00134-003-1761-8

Forkus, S. R., Raudales, A. M., Rafiuddin, H. S., Weiss, N. H., Messman, B. A., & Contractor, A. A. (2023). The Posttraumatic Stress Disorder (PTSD) Checklist for DSM–5: A systematic review of existing psychometric evidence. Clinical Psychology: Science and Practice, 30, 110–121. https://doi.org/10.1037/cps0000111

Fung H.W., Chan C., Lee C.Y., & Ross C.A. (2019). Using the Post-traumatic Stress Disorder (PTSD) Checklist for DSM-5 to Screen for PTSD in the Chinese Context: A Pilot Study in a Psychiatric Sample. Journal of Evidence-Based Social Work (2019), 16(6), Article 6. https://doi.org/10.1080/26408066.2019.1676858

Geier T.J., Hunt J.C., Nelson L.D., Brasel K.J., & deRoon-Cassini T.A. (2019). Detecting PTSD in a traumatically injured population: The diagnostic utility of the PTSD Checklist for DSM-5. Depression and Anxiety, 36(2), Article 2. https://doi.org/10.1002/da.22873

Geier T.J., Hunt J.C., Hanson J.L., Heyrman K., Larsen S.E., Brasel K.J., & deRoon-Cassini T.A. (2020). Validation of Abbreviated Four- and Eight-Item Versions of the PTSD Checklist for DSM-5 in a Traumatically Injured Sample. Journal of Traumatic Stress, 33(3), Article 3. https://doi.org/10.1002/jts.22478

Fung H.W., Chan C., Lee C.Y., & Ross C.A. (2019). Using the Post-traumatic Stress Disorder (PTSD) Checklist for DSM-5 to Screen for PTSD in the Chinese Context: A Pilot Study in a Psychiatric Sample. Journal of Evidence-Based Social Work (2019), 16(6), Article 6. https://doi.org/10.1080/26408066.2019.1676858

Geier T.J., Hunt J.C., Hanson J.L., Heyrman K., Larsen S.E., Brasel K.J., & deRoon-Cassini T.A. (2020). Validation of Abbreviated Four- and Eight-Item Versions of the PTSD Checklist for DSM-5 in a Traumatically Injured Sample. Journal of Traumatic Stress, 33(3), Article 3. https://doi.org/10.1002/jts.22478

Ghazali, S. R., & Chen, Y. Y. (2018). Reliability, concurrent validity, and cutoff score of PTSD Checklist (PCL-5) for the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition among Malaysian adolescents. Traumatology, 24(4), Article 4. https://doi.org/10.1037/trm0000156

Goldstein, R. B., Smith, S. M., Chou, S. P., Saha, T. D., Jung, J., Zhang, H., Pickering, R. P., Ruan, W. J., Huang, B., & Grant, B. F. (2016). The Epidemiology of DSM-5 Posttraumatic Stress Disorder in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions-III. Social Psychiatry and Psychiatric Epidemiology, 51(8), 1137–1148. https://doi.org/10.1007/s00127-016-1208-5

Grau, P., Garnier-Villarreal, M., & Wetterneck, C. (2019). An analysis of the latent factor structure of the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5) in a PTSD partial hospitalization program. Traumatology, 25, 269–274. https://doi.org/10.1037/trm0000200

Hall, B. J., Yip, P. S. Y., Garabiles, M. R., Lao, C. K., Chan, E. W. W., & Marx, B. P. (2019). Psychometric validation of the PTSD checklist-5 among female Filipino migrant workers. European Journal of Psychotraumatology, 10(1), Article 1. https://doi.org/10.1080/20008198.2019.1571378

Hansen, M., Vaegter, H. B., Ravn, S. L., & Andersen, T. E. (n.d.). Validation of the Danish PTSD Checklist for DSM-5 in trauma-exposed chronic pain patients using the Clinician-Administered PTSD Scale for DSM-5. European Journal of Psychotraumatology, 14(1), 2179801. https://doi.org/10.1080/20008066.2023.2179801

Ho C.-L., Schlenger W.E., Kulka R.A., & Marmar C.R. (2017). The influence of different criteria for establishing optimal cutoff scores on performance of two self-report measures for warzone PTSD. Psychological Assessment, 29(2), Article 2. https://doi.org/10.1037/pas0000307

Ibrahim H., Ertl V., Catani C., Ismail A.A., & Neuner F. (2018). The validity of Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5) as screening instrument with Kurdish and Arab displaced populations living in the Kurdistan region of Iraq. BMC Psychiatry, 18(1), Article 1. https://doi.org/10.1186/s12888-018-1839-z

Ito, M., Takebayashi, Y., Suzuki, Y., & Horikoshi, M. (2019). Posttraumatic stress disorder checklist for DSM-5: Psychometric properties in a Japanese population. *Journal of Affective Disorders*, *247*, 11–19. https://doi.org/10.1016/j.jad.2018.12.086

Jiang, C., Xue, G., Yao, S., Zhang, X., Chen, W., Cheng, K., Zhang, Y., Li, Z., Zhao, G., Zheng, X., & Bai, H. (2023). Psychometric properties of the post-traumatic stress disorder checklist for DSM-5 (PCL-5) in Chinese stroke patients. BMC Psychiatry, 23(1), 16. https://doi.org/10.1186/s12888-022-04493-y

Kagee A., Bantjes J., Saal W., & Sterley A. (2022). Predicting Posttraumatic Stress Disorder Caseness Using the PTSD Checklist for DSM-5 Among Patients Receiving Care for HIV. Journal of Traumatic Stress, 35(1), Article 1. https://doi.org/10.1002/jts.22654

Kagee, A., Tsai, A. C., Lund, C., & Tomlinson, M. (2013). Screening for common mental disorders in low resource settings: Reasons for caution and a way forward. International Health, 5(1), 11–14. https://doi.org/10.1093/inthealth/ihs004

Kim W.-H., Jung Y.-E., Roh D., Kim D., Chae J.-H., & Park J.E. (2022). Development of Korean Version of PTSD Checklist for DSM-5 (K-PCL-5) and the Short Form (K-PCL-5-S). Psychiatry Investigation, 19(8), Article 8. https://doi.org/10.30773/pi.2022.0092

Kramer, L. B., Whiteman, S. E., Petri, J. M., Spitzer, E. G., & Weathers, F. W. (2023). Self-Rated Versus Clinician-Rated Assessment of Posttraumatic Stress Disorder: An Evaluation of Discrepancies Between the PTSD Checklist for DSM-5 and the Clinician-Administered

PTSD Scale for DSM-5. Assessment, 30(5), 1590–1605. https://doi.org/10.1177/10731911221113571

Kruger-Gottschalk A., Knaevelsrud C., Rau H., Dyer A., Schafer I., Schellong J., & Ehring T. (2017). The German version of the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Psychometric properties and diagnostic utility. BMC Psychiatry, 17(1), Article 1. https://doi.org/10.1186/s12888-017-1541-6

Lewis, S. J., Arseneault, L., Caspi, A., Fisher, H. L., Matthews, T., Moffitt, T. E., Odgers, C. L., Stahl, D., Teng, J. Y., & Danese, A. (2019). The epidemiology of trauma and post-traumatic stress disorder in a representative cohort of young people in England and Wales. The Lancet Psychiatry, 6(3), 247–256. https://doi.org/10.1016/S2215-0366(19)30031-8

Levitt E.E., Syan S.K., Sousa S., Costello M.J., Rush B., Samokhvalov A.V., McCabe R.E., Kelly J., & MacKillop J. (2021). Optimizing screening for depression, anxiety disorders, and post-traumatic stress disorder in inpatient addiction treatment: A preliminary investigation. Addictive Behaviors, 112. Canada. https://doi.org/10.1016/j.addbeh.2020.106649

Lotzin, A., Acquarini, E., Ajdukovic, D., Ardino, V., Böttche, M., Bondjers, K., Bragesjö, M., Dragan, M., Grajewski, P., Figueiredo-Braga, M., Gelezelyte, O., Javakhishvili, J. D., Kazlauskas, E., Knefel, M., Lueger-Schuster, B., Makhashvili, N., Mooren, T., Sales, L., Stevanovic, A., & Schäfer, I. (2020). Stressors, coping and symptoms of adjustment disorder in the course of the COVID-19 pandemic – study protocol of the European Society for Traumatic Stress Studies (ESTSS) pan-European study. European Journal of Psychotraumatology, 11(1), 1780832. https://doi.org/10.1080/20008198.2020.1780832

McDonald, S. D., & Calhoun, P. S. (2010). The diagnostic accuracy of the PTSD checklist: A critical review. Clinical Psychology Review, 30(8), 976–987. https://doi.org/10.1016/j.cpr.2010.06.012

McCabe, R. E., Milosevic, I., Rowa, K., Shnaider, P., Pawluk, E. J., Antony, M. M. & the DART Working Group. (2017). Diagnostic Assessment Research Tool (DART). St. Joseph's Healthcare/McMaster University.

Manus, S., Bebbington, P., Jenkins, R., & Brugha, T. (eds.) (2016) *Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014*. Leeds: NHS Digital

Martinez-Levy G.A., Bermudez-Gomez J., Merlin-Garcia I., Flores-Torres R.P., Nani A., Cruz-Fuentes C.S., Briones-Velasco M., Ortiz-Leon S., & Mendoza-Velasquez J. (2021). After a disaster: Validation of PTSD checklist for DSM-5 and the four- and eight-item abbreviated versions in mental health service users. Psychiatry Research, 305. https://doi.org/10.1016/j.psychres.2021.114197

Morrison K., Su S., Keck M., & Beidel D.C. (2021). Psychometric properties of the PCL-5 in a sample of first responders. Journal of Anxiety Disorders, 77.. https://doi.org/10.1016/j.janxdis.2020.102339

Murphy, D., Ross, J., Ashwick, R., Armour, C., & Busuttil, W. (2017). Exploring optimum cut-off scores to screen for probable posttraumatic stress disorder within a sample of UK treatment-seeking veterans. European Journal of Psychotraumatology, 8(1), Article 1. https://doi.org/10.1080/20008198.2017.1398001

National Collaborating Centre for Mental Health. (2023). *The Improving Access to Psychological Therapies Manual.* NHS England. Version 6. https://www.england.nhs.uk/wp-content/uploads/2018/06/the-nhs-talking-therapies-manual-v6.pdf

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ.* 2021;372:n71.https://doi.org/10.1136/bmj.n71

Pereira-Lima, K., Loureiro, S. R., Bolsoni, L. M., Apolinario da Silva, T. D., & Osorio, F. L. (2019). Psychometric properties and diagnostic utility of a Brazilian version of the PCL-5 (complete and abbreviated versions). European Journal of Psychotraumatology, 10(1), Article 1. https://doi.org/10.1080/20008198.2019.1581020

Posit team (2023). *RStudio: Integrated Development Environment for R.* Posit Software, PBC, Boston, MA. URL http://www.posit.co/ (Accessed January 2023).

Price M., Szafranski D.D., Van Stolk-Cooke K., & Gros D.F. (2016). Investigation of abbreviated 4 and 8 item versions of the PTSD Checklist 5. Psychiatry Research, 239. https://doi.org/10.1016/j.psychres.2016.03.014

Prins, A., Bovin, M. J., Kimerling, R., Kaloupek, D. G., Marx, B. P., Pless Kaiser, A., & Schnurr, P. P. (2015). The Primary Care PTSD Screen for DSM-5 (PC-PTSD-5). [Measurement instrument].

R Core Team (2022). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Rentmeesters, N., & Hermans, D. (2023). Posttraumatic stress disorder in Belgian police officers: Prevalence and the effects of exposure to traumatic events. European Journal of Psychotraumatology, 14(1), 2156558. https://doi.org/10.1080/20008066.2022.2156558

Resick, P. A., Straud, C. L., Wachen, J. S., LoSavio, S. T., Peterson, A. L., McGeary, D. D., Young-McCaughan, S., Taylor, D. J., & Mintz, J. (2023). A comparison of the CAPS-5 and PCL-5 to assess PTSD in military and veteran treatment-seeking samples. European Journal of Psychotraumatology, 14(2), 2222608. https://doi.org/10.1080/20008066.2023.2222608

Review Manager (RevMan) [Computer program]. Version 5.4. The Cochrane Collaboration, 2020. Available at revman.cochrane.org

Roberts N.P., Kitchiner N.J., Lewis C.E., Downes A.J., & Bisson J.I. (2021). Psychometric properties of the PTSD Checklist for DSM-5 in a sample of trauma exposed mental health service users. European Journal of Psychotraumatology, 12(1), Article 1. https://doi.org/10.1080/20008198.2020.1863578

Rosendahl, J., Kisyova, H., Gawlytta, R., & Scherag, A. (2019). Comparative validation of three screening instruments for posttraumatic stress disorder after intensive care. Journal of Critical Care, 53, 149–154. https://doi.org/10.1016/j.jcrc.2019.06.016

Rucker, G., Steinhauser, S., Kolampally, S., & Schwarzer, G. (2021). *Diagmeta: Meta-Analysis of Diagnostic Accuracy Studies with Several Cutpoints*. Version: 0.5-1. https://cran.r-project.org/web/packages/diagmeta/index.html. (Accessed January 2023).

Salehi, M., Amanat, M., Mohammadi, M., Salmanian, M., Rezaei, N., Saghazadeh, A., & Garakani, A. (2021). The prevalence of post-traumatic stress disorder related symptoms in Coronavirus outbreaks: A systematic-review and meta-analysis. Journal of Affective Disorders, 282, 527–538. https://doi.org/10.1016/j.jad.2020.12.188

Salleh, M., Ismail, H., & Yusoff, H. (2021). Reliability and validity of a post-traumatic checklist-5 (PCL-5) among fire and rescue officers in Selangor, Malaysia. JOURNAL OF HEALTH RESEARCH, 35(4), Article 4. https://doi.org/10.1108/JHR-11-2019-0243

Schneider, L. H., Pawluk, E. J., Milosevic, I., Shnaider, P., Rowa, K., Antony, M. M., Musielak, N., & McCabe, R. E. (2022). The Diagnostic Assessment Research Tool in action: A preliminary evaluation of a semistructured diagnostic interview for DSM-5 disorders. Psychological Assessment, 34(1), 21–29. https://doi.org/10.1037/pas0001059

Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R., & Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. The Journal of Clinical Psychiatry, 59 Suppl 20, 22-33;quiz 34-57. https://pubmed.ncbi.nlm.nih.gov/9881538/

Sijbrandij, M., Reitsma, J. B., Roberts, N. P., Engelhard, I. M., Olff, M., Sonneveld, L. P., & Bisson, J. I. (2013). Self-report screening instruments for post-traumatic stress disorder (PTSD) in survivors of traumatic experiences. Cochrane Database of Systematic Reviews, 6. https://doi.org/10.1002/14651858.CD010575

Stevelink, S. A. M., Jones, M., Hull, L., Pernet, D., MacCrimmon, S., Goodwin, L., MacManus, D., Murphy, D., Jones, N., Greenberg, N., Rona, R. J., Fear, N. T., & Wessely, S. (2018). Mental health outcomes at the end of the British involvement in the Iraq and Afghanistan conflicts: A cohort study. The British Journal of Psychiatry, 213(6), 690–697. https://doi.org/10.1192/bjp.2018.175

Steinhauser, S., Schumacher, M., & Rücker, G. (2016). Modelling multiple thresholds in meta-analysis of diagnostic test accuracy studies. BMC Medical Research Methodology, 16(1), 97. https://doi.org/10.1186/s12874-016-0196-1

US Department of Veterans Affairs. (2023). *Clinician-Administered PTSD Scale for DSM-5 (CAPS-5)*. PTSD: National Center for PTSD. https://www.ptsd.va.gov/

Verhey R., Chibanda D., Gibson L., Brakarsh J., & Seedat S. (2018). Validation of the posttraumatic stress disorder checklist—5 (PCL-5) in a primary care population with high HIV prevalence in Zimbabwe. BMC Psychiatry, 18(1), Article 1. https://doi.org/10.1186/s12888-018-1688-9

Weathers, F.W., Blake, D.D., Schnurr, P.P., Kaloupek, D.G., Marx, B.P., & Keane, T.M. (2013a). The Clinician-Administered PTSD Scale for DSM-5 (CAPS-5). [Assessment] Available from www.ptsd.va.gov

Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P. (2013). The PTSD Checklist for *DSM-5* (PCL-5). Scale available from the National Center for PTSD at www.ptsd.va.gov

Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). The PTSD Checklist for DSM-5 (PCL-5) – LEC-5 and Extended Criterion A [Measurement instrument]. Available from https://www.ptsd.va.gov/

Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P. (2013). Using the PTSD Checklist for DSM-5 (PCL-5). Available : https://www.ptsd.va.gov/professional/assessment/documents/using-PCL5.pdf Accessed: 14/03/23

Whiting, P. F., Rutjes, A. W. S., Westwood, M. E., Mallett, S., Deeks, J. J., Reitsma, J. B., Leeflang, M. M. G., Sterne, J. A. C., Bossuyt, P. M. M., & QUADAS-2 Group. (2011). QUADAS-2: A revised tool for the quality assessment of diagnostic accuracy studies. Annals of Internal Medicine, 155(8), 529–536. https://doi.org/10.7326/0003-4819-155-8-201110180-00009

World Health Organization. (2014). Developing guideline recommendations for tests or diagnostic tools. In *Handbook for Guideline Development*. WHO. https://apps.who.int/iris/bitstream/handle/10665/145714/9789241548960-chap17-eng.pdf?sequence=20&isAllowed=y

Wortmann J.H., Jordan A.H., Weathers F.W., Resick P.A., Dondanville K.A., Hall-Clark B., Foa E.B., Young-McCaughan S., Yarvis J.S., Hembree E.A., Mintz J., Peterson A.L., & Litz B.T. (2016). Psychometric analysis of the PTSD checklist-5 (PCL-5) among treatment-seeking military service members. Psychological Assessment, 28(11), Article 11. https://doi.org/10.1037/pas0000260

**Paper 2: Empirical Study**

# The Impact of Complex Post- Traumatic Stress Disorder on Postnatal Bonding

Adam Joshua Cann[1]

[1] South Wales Doctoral Programme in Clinical Psychology, School of Psychology, Cardiff University, 11th Floor, Tower Building, 70 Park Place, Cardiff, CF10 3AT.
Corresponding author: CannAJ@cardiff.ac.uk

Supervised by:
Professor Neil Roberts [2]
Dr. Cerith Waters [3]

[2] Cardiff & Vale University Health Board and Division of Psychological Medicine and Clinical Neuroscience, Cardiff University

[3] South Wales Doctoral Programme in Clinical Psychology, Cardiff University

Word Count: 5,858

This manuscript was prepared in accordance with the author guidelines for the Journal of Affective Disorders (see *Appendix G.*). The South Wales DClinPsy word limit of 8,000 words has been used to ensure comprehensiveness in examination.

**Abstract**

*Background*

Postnatal Depression and Post-Traumatic Stress Disorder (PTSD) have been associated with impaired mother-infant bonding, however the impact of Complex PTSD is unknown. Complex PTSD consists of two core symptoms clusters: PTSD (re-experiencing, avoidance, sense of current threat) and disturbance of self-organisation (DSO) (affective dysregulation, negative self concept, disturbances in relationships).

*Methods*

Two-hundred and ninety-four perinatal women completed standardised self-report measures that assessed PTSD, CPTSD, depressive symptoms and postnatal bonding difficulties. Postnatal bonding difficulties were compared across four clinically significant groups: PTSD, CPTSD, DSO-only and a 'no trauma disorder' group. Path analysis was used to test a model in which higher levels of PTSD and DSO symptoms were predicted to have direct effects on postnatal bonding difficulties, as well as indirect effects mediated by depressive symptoms.

*Results*

Increased bonding difficulties were found in CPTSD and DSO groups compared to the no trauma disorder group. Women with CPTSD reported significantly more bonding problems than women with PTSD. In the path analyses, increased DSO symptoms had significant direct effects on bonding difficulties and indirect effects via depressive symptoms. Elevated PTSD symptoms predicted decreased postnatal bonding difficulties.

*Limitations*

Self-report measures of psychopathology and bonding difficulties were employed, rather than observational assessments or structured-interviews. The impact of comorbidity was only examined for depressive symptoms.

*Conclusions*

This study represents preliminary evidence for DSO symptomology driving postnatal bonding difficulties rather than core PTSD symptoms. The group experiencing only DSO symptoms had substantial bonding difficulties and the relationship between these difficulties may not be appreciated in clinical practice or existing research.

*Key words*

Postnatal; Postpartum; Bonding; CPTSD; PTSD; Depression

*Highlights*

- Post- Traumatic Stress Disorder has been linked to impaired mother-infant bonding
- Complex PTSD consists of PTSD and Disturbance of Self Organisation (DSO) symptoms
- Poorer bonding was reported with clinical CPTSD and DSO, but not PTSD, symptoms
- Path analysis tested effects of PTSD and DSO on bonding, mediated by depression
- DSO symptoms had direct and indirect effects, via depression, on bonding

## Introduction

Mother -infant bonding in the postnatal period is described as the early emotional connection felt by the mother towards the infant (Nolvi et al., 2016; Brockington, 2004); a strong bond has been associated with positive parenting behaviours, emotional development and cognitive development of infants (Bauer et al. 2014; Bicking, & Hupcey, 2013; Handelzalts et al., 2021 Brockington, 2004; Parfitt et al., 2014). Difficulties in mother-infant bonding have been implicated in social-emotional development, the quality of interactions between mother and infant, the development of infant attachment problems, infant emotional regulation and increased risk of childhood anxiety and depression (Ostlund et al., 2017; Mason, Briggs & Silver, 2011; McElwain, & Booth-LaForce, 2006; Hayes et al., 2013; Schmid et al., 2011). Brockington et al. (2006) describe impairments in postnatal maternal-infant bonding that include delays in the mother's emotional responses towards her infant, feelings of anger, rejection of the child, maternal anxiety and the reporting of incipient abuse.

It is well established that depression is negatively associated with postnatal bonding (Tichelman et al., 2019; Cuijlits et al., 2019; Slomian et al., 2019; Rossen et al., 2019). Evidence suggests that mother-infant bonding problems tend to be relatively stable throughout the first year in those with depression symptoms (O'Higgins et al., 2013). Lara-Cinisomo et al., (2018) found evidence that postnatal depression was associated with feelings of rejection and anger towards the infant. Lara-Cinisomo and colleagues

administered the Postpartum Bonding Questionnaire in their study (PBQ; Brockington, 2001; Brockington et al., 2006), a widely used measure of perceived postnatal bonding problems.

There is evidence that even subclinical depressive symptoms may have an adverse impact on postnatal bonding (Tietz et al., 2014; Behrendt et al., 2016). Behrendt and colleagues (2016) found poorer mother-infant bonding and higher infant-focused hostility at 6-8 months postnatally for women with sub-clinical depression symptoms. The impacts of postnatal depression symptoms on bonding have been identified across cultures (e.g. Lebanon, Behr et al, 2018; Poland, Lutkiewicz el., 2020; Ethiopia, Hailemeskel et al., 2022; Japan, Tokuda et al., 2021).

The prevalence of PTSD in the perinatal period has been estimated to be 3.2% in non-clinical community samples and 15.7% in higher-risk samples (those with maternal psychiatric history, history of trauma and perinatal risk) (Grekin & O'Hara, 2014). Staudt and colleagues (2023) have found that previous PTSD symptoms, younger age of mother, fear of childbirth, lower education and a poorer subjective birth experience predicted increased postnatal PTSD symptoms. In their review Yildiz and colleagues (2017) estimated postnatal PTSD to be 4.0% in community samples and 18.5% in higher risk samples, such as those with a history of abuse, or women who experienced pregnancy or birth complications.

Comparatively fewer studies have addressed associations between PTSD and postnatal bonding difficulties. PTSD symptoms in the postnatal period have been associated with parenting stress and dysfunctional mother-infant interactions (McDonald et al., 2011); poorer infant emotional and cognitive development (Garthus-Niegel et al., 2017; Parfitt et al., 2014); increased bonding difficulties and maternal depression (Parfitt & Ayers, 2009); reduced sensitivity and structuring in play (Feeley et al., 2011); lower breastfeeding rates (Garthus-Niegel et al., 2018); and sub-optimal infant emotional regulation at 6 and 13-months (Bosquet Enlow et al., 2011). The emotional numbing and avoidance that features in PTSD is frequently stated as a possible mechanism for these difficulties. Ionio & Di Blasio (2014) found evidence that mothers with PTSD seek proximity with their children but with reduced engagement when in a novel situation. Ionio & Di Blasio (2014) note that this may be due to mothers feeling less secure in their relationship to their children, leading them to compensate with closeness.

There are mixed results in studies of the impacts of PTSD on parent-infant relationships. In contrast to studies finding evidence for an association between PTSD symptoms and bonding difficulties (e.g. Davies et al., 2008; Ionio & Di Blasio, 2014; McDonald et al., 2011;

Parfitt and Ayers, 2009; Seng et al.'s (2013), Parfitt and colleagues (2013) found no association between PTSD symptoms and parent-infant interactional behaviour. Similarly, Ayers et al. (2007), Parfitt et al. (2014) and McDonald et al., (2011) did not find an association between PTSD and self-reported mother-baby bonding difficulties. Kolk et al., (2021) also did not find an association between mother trauma-exposure and postnatal bonding. In their reviews, Cook et al. (2018) and Simpson et al., (2018) suggest that the available evidence appears to indicate that PTSD and parent-infant postnatal bonding are related, with methodological issues accounting for the mixed results across studies (e.g. limited power).

PTSD and depression have been found to be highly comorbid in perinatal samples, co-morbidity may be as high as 44.1% in pregnancy and 17.7% postnatally (Hairston et al., 2018; Garthus-Niegel et al., 2018; Gavin et al, 2005). Co-morbid PTSD and depression in the postnatal period have been associated with poorer postnatal bonding, with mechanisms thought to be related to reduced sensitivity and responsiveness (Erickson et al., 2019). Parfitt & Ayers (2009) highlight the importance of separating the influence of depression and PTSD on parent–infant bonding. Small but significant effects for both PTSD and depression impacting postnatal bonding were found; whilst a large effect was found for the relationship between PTSD and depression. Radoš et al. (2020) also found both direct and indirect effects of PTSD on bonding problems, with depression as a mediating factor. Muzik et al., (2017) examined the impact of depression and PTSD using both self-report measures and mother-infant observations. Mothers with depression and those with co-morbid depression and PTSD showed significantly more bonding difficulties than a no trauma disorder group. Depression was shown, regardless of PTSD symptoms, to be most impairing on mother-infant interactions (e.g. sensitivity, lower positive affect and higher negative affect). Whereas in Seng et al.'s (2013) study, comorbidity of depression and PTSD was most associated with bonding difficulties. It is important therefore to understand the unique effects of depression and PTSD symptomology on postnatal bonding problems.

To our knowledge there are no published studies examining the impact of Complex Post-Traumatic Stress Disorder (CPTSD) on mother-infant postnatal bonding. Those with ICD-11 CPTSD experience both the core symptoms of Post- Traumatic Stress Disorder (PTSD) (re-experiencing of the traumatic memory; avoidance and a persistent sense of threat and physiological arousal) whilst also experiencing difficulties characterised by disturbances of self organisation (DSO) (Hyland, Shevlin & Brewin, 2023). The DSO symptom cluster consists of problems with affect regulation; negative self concept (e.g., beliefs about oneself as diminished, defeated or worthless; feelings of shame, guilt or failure related to the

traumatic event(s)) and difficulties in sustaining relationships and in feeling close to others (WHO, 2018; Shevlin et al., 2017). Although probable CPTSD diagnosis requires both symptom clusters, DSO symptoms have been associated with depression and may have unique impacts compared to PTSD symptomology (Vang et al., 2021; Ho et al., 2020; Bachem et al.,2021; Li et al., 2023). Karatzias and colleagues (2019) suggest that CPTSD may be more common than PTSD in clinical populations and has been found to be highly comorbid with depression.

Traumatic events that predispose individuals to develop CPTSD are personally threatening or horrific in nature much like PTSD; however, in CPTSD, events are typically prolonged, repeated and of an interpersonal nature, from which escape is difficult or impossible (Brewin et al., 2017). Examples of such traumatic events are torture, prolonged domestic violence or repeated childhood sexual abuse (Hyland et al., 2017). It is theorised that traumatic events of this nature that are more likely to lead to difficulties in interpersonal relationships and self-regulation (Cloitre et al., 2009; Raby et al., 2017; Karatzias et al., 2021). Compared to PTSD, CPTSD is associated with increased negative and self-blaming cognitions, difficulties with attachment, tendencies towards less cognitive reappraisal emotion-regulation strategies and more expressive suppression strategies (Karatzias et al., 2018).

A growing body of research has shown the adverse impact of developmental trauma on perinatal outcomes, intergenerational transmission of abuse and neglect. Maternal history of childhood mistreatment has been shown to put mother-infant relationships at risk for attachment disorganisation (Ludmer et al., 2018). Hairston et al., (2018) found evidence that insecure attachment styles were associated with postnatal bonding difficulties, with PTSD and depression symptoms mediating these effects. Depression mediated the impact of anxious/ambivalent attachment on bonding, whilst PTSD mediated the impact of avoidant attachment style on bonding. Savage et al., (2019) found that experiences of childhood mistreatment – a traumatic event-type associated with CPTSD - were moderately associated with relationship-based difficulties between mother and infant, including impaired bonding.

With evidence of links between mother-infant bonding, prolonged interpersonal trauma, attachment style and quality, interpersonal relationships, emotional-regulation and negative self-directed appraisals, DSO symptomology may be pertinent to the quality of mother-infant relationships and postnatal bonding. The independent impacts of such symptomology on bonding may not be delineated by study designs examining the impacts of, broader, DSM or earlier ICD definitions of PTSD.

This aim of this study was to examine the relationship between ICD-11 CPTSD, PTSD and depression symptomology on perceived mother-infant postnatal bonding. We predicted that those meeting criteria for clinical CPTSD, PTSD and DSO-only symptoms would report higher bonding difficulties than those who do not meeting these criteria. Given the novelty of the research, exploratory analyses also compared the three clinical groups (e.g., PTSD, CPTSD & DSO) against each other. We predicted that these clinical groups would score significantly higher on depression symptoms than those who not meeting these criteria. In an analysis of the specific contribution of PTSD and DSO on postnatal bonding across all participants, we hypothesised that PTSD and DSO would have a significant direct negative effects on postnatal bonding. We also hypothesised that these effects would be mediated indirectly by depression.

## Method

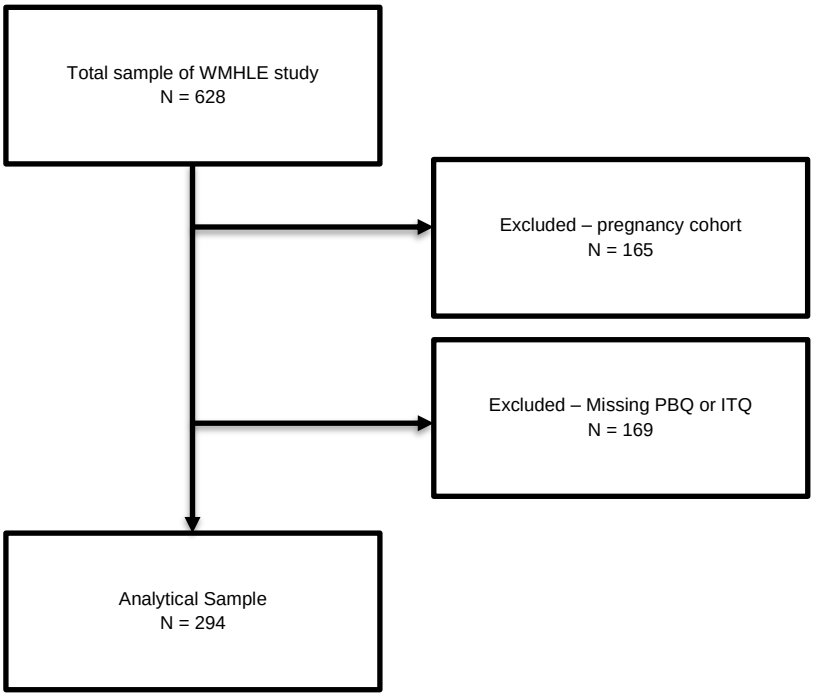
### Sample

The present study recruited from the Maternal Wellbeing, Mental Health & Life Experiences (MWMHLE) study hosted by the National Centre for Mental Health (NCMH). The MWMHLE is a collaboration between NCMH, Health and Care Research Wales, Cardiff University, Swansea University, Bangor University and NHS Health Boards/ Trusts throughout England and Wales. Perinatal women were recruited during pregnancy and postpartum via NHS primary (e.g., midwifery services) and secondary care health services (e.g., specialist perinatal mental health teams) and via an online open access survey, between May 2021 and November 2022. Online advertising was employed in the open survey via social media platforms. Ethical approval was granted from the National Research Ethics Service in 2021 and NHS (Research and Development) permissions were also obtained. Consent was obtained via the online survey following reading participant information (see *Appendix H.* for NCMH Online Storyboard including consent process).

Following data collection there were an initial cohort of N = 628. Initial eligibility criteria for recruitment into the wider MWMHLE study was: (1) being pregnant or having given birth within 12-months and (2) being 18-years-old or over; whilst inclusion criteria for the present study was: (1) within 18-months postpartum; and (2) being 18-years-old or over. There were a small number of participants who completed the survey who were within 12- 18 months postpartum, it was decided to include these participants in the analysis to maximise the analytic sample whilst preserving the focus on early infant-mother relationships (N=16/ 5.4%). The majority of participants had given birth within the prior 6 months (54.1%). The

mean age of the infants at completion of the survey was 5.8 months (SD: 3.6). Those who stated that they were pregnant at the time of completion were excluded from the current study, as the measure of bonding could only be used postnatally. The final sample size included in the analysis was N=294 (see *Figure 1*). Sample characteristics can be found in *Table 1.*

*Figure. 1. Flow diagram for the inclusion process*




The sample was 89.8% White British (N=264), with the next most common ethnicities being 6.8% any other white background (N=20); 1% White Irish (N=3); 0.7% (N=2) White and Asian; 0.7% (N=2) White and Black African; 0.3% (N=1) White and Black Caribbean; 0.3% (N=1) Indian; 0.3% (N=1) not reported. The sample identified as 86.7% heterosexual (N=255), 7.8% bisexual (N=23) and 1.4% gay or lesbian (n=4); with 1.7% not reported (N=5), 1.7% other (N=5) and 0.7% not sure (N=2). The sample was mostly coupled (95.2%; N=280) on their first child (67%; N=197) or second child (24.8%; N=74), highly educated (77.2% degree or higher; N=227) and with a high rate of employment (83.7%; N=246).

Data on number of live births, mental health diagnoses, and borderline personality disorder screening were not consistently completed and could not be reported.

*Table 1. Sample Demographic Characteristics*

*Where age not reported, participants reported they had given birth in the last 12 months

| **Sample (N/%)** | | **N= 294** |
|---|---|---|
| ***Average* Age *(SD)*** | | 32.6 (4.9) |
| **Ethnicity (N/%)** | White British (Welsh, English, Scottish, Northern Irish) | 264 (89.8%) |
| | Any other white background | 20 (6.8%) |
| | White Irish | 3 (1%) |
| | White and Asian | 2 (0.7%) |
| | White and Black African | 2 (0.7%) |
| | White and Black Caribbean | 1 (0.3%) |
| | Indian | 1 (0.3%) |
| | Not reported | 1 (0.3%) |
| **Sexual Orientation (N/%)** | Heterosexual or straight | 255 (86.7%) |
| | Bisexual | 23 (7.8%) |
| | Gay or Lesbian | 4 (1.4%) |
| | Not reported | 5 (1.7%) |
| | Other | 5 (1.7%) |
| | Not sure | 2 (0.7%) |
| **Age of baby (N/%)** | 0-3 months | 79 (26.9%) |
| | 3-6 months | 80 (27.2%) |
| | 6-12 months | 110 (37.4%) |
| | 12-18 months | 16 (5.4%) |
| | Not reported* | 9 (3.1%) |
| **Single baby or twins** | Single | 289 (98.3%) |
| | Twins | 4 (1.4%) |
| | Not Reported | 1 (0.3%) |
| **Recent birth child number** | 1st | 197 (67%) |
| | 2nd | 73 (24.8%) |
| | 3rd | 13 (4.4%) |
| | 4th | 5 (1.7%) |
| | 5th | 2 (0.7%) |
| | Not reported | 4 (1.4%) |
| **Employment (N/%)** | Employed | 246 (83.7%) |
| | Self-employed | 18 (6.1%) |
| | Homemaker | 12 (4.1%) |
| | Not employed and not seeking employment | 8 (2.7%) |
| | Student | 4 (1.4%) |
| | Not working due to disability | 2 (0.7%) |
| | Not reported | 2 (0.7%) |
| | Not employed and looking for work | 1 (0.3%) |
| | Volunteering | 1 (0.3%) |
| **Married or partnered (N/%)** | Yes | 280 (95.2%) |
| | No | 13 (4.4%) |
| | Not reported | 1 (0.3%) |
| **Highest Education** | Degree, Masters, PhD or Professional Qualification (it was not possible to break down further) | 227 (77.2%) |
| | 2+ A Levels or equivalent | 29 (9.9%) |
| | 5+ GCSE's or equivalent | 19 (6.5%) |
| | 1-4 GCSE's or equivalent | 15 (5.1%) |
| | Not reported | 2 (0.7%) |
| | Apprenticeship | 1 (0.3%) |
| | Other vocational qualifications | 1 (0.3%) |

## Procedure

Participants were asked to complete an online consent form and survey for their respective stage of the perinatal period. Participants completed a variety of demographic, birth experience and health related questionnaires, alongside a series of standardised measures of psychopathology, psychosocial and relational functioning. These measures included psychological assessments of mother-infant bonding, trauma exposure, traumatic stress disorders and depression.

## Measures

*International Trauma Questionnaire (ITQ)*

The International Trauma Questionnaire (ITQ) is an 18-item self-report measure of PTSD and CPTSD based on ICD-11 criteria (Cloitre et al., 2018). The ITQ is made up of two six-item clusters that identify PTSD and DSO symptoms; with functional impairment items following each subscale (assessing functional impairment items in relationships, work and other important areas). Respondents rate their symptoms on a five-point likert scale from '0 - Not at all' up to '4 – Extremely'. Each cluster has four subscales including a functional impairment subscale. The PTSD subscales are: 're-experiencing in the here and now', 'avoidance', 'sense of current threat' and functional impairment items. The DSO substances are: 'affective dysregulation', 'negative self concept', 'disturbances in relationships', and functional impairment items (as above). The subscales and clusters can be summed for dimensional scoring whilst diagnostic rules provide a provisional PTSD and CPTSD criteria. PTSD criteria is established by scores of ≥2 on at least one of each PTSD subscale; whilst DSO criteria is established by scores of ≥2 on at least one of each DSO subscale. For a provisional PTSD diagnosis, respondents must meet PTSD criteria but not DSO criteria; for provisional CPTSD diagnosis, respondents must meet PTSD and DSO criteria. DSO criteria alone does not indicate a diagnosis. The measure has been found to be a valid, reliable measure of PTSD and CPTSD across cultures, whilst providing further evidence for the ICD-11 criteria for CPTSD (Cloitre et al., 2018; Vallières et al., 2018; Karatzias et al., 2018). In the present study the ITQ data was used to construct three clinically significant trauma symptom groups (CPTSD, PTSD, DSO-only) and one 'no trauma disorder' reference group - those did not report clinically significant trauma symptoms. A DSO-only group was added the analysis to examine the impact of this symptom cluster in participants without PTSD

symptomology. Symptom cluster scores were also used as a continuous variables (i.e. PTSD sum, DSO sum) in the path analysis (as in Li et al., 2023).

*Postpartum Bonding Questionnaire (PBQ)*

The PBQ is a 25-item self-report questionnaire, screening for problems in mother-infant bonding. Items ask mothers about feelings towards their baby and their relationship with their baby. Items are scored on a 6- point scale between '0' - 'Always' and '5' - 'Never', with reverse items. The total score ranges from 0-125. The original factor structure of the PBQ contained four sub-scales examining aspects of bonding: general bonding disorders, mother-infant relationship disorders, infant- related anxiety and risk of abuse (Brockington et al., 2001; Brockington et al., 2006). Suggested cut-off scores are offered for each subscale to identify problems in bonding (scale 1 ≥12; scale 2 ≥ 17; scale 3 ≥ 10; scale 4≥ 3).

Further studies examining the psychometric properties of the PBQ have produced varying models of the measure, with varying subscales of items. A number of studies cast doubt about the original factor model for the PBQ and, particularly, the psychometric validity and clinical utility of the risk of abuse subscale. For example, there are models that contain four-subscales (Garcia-Esteve et al., 2016; Reck et al., 2006; Suetsugu et al., 2015), three subscales (Busonera et al., 2017; Lavallée et al., 2023; Ohashi et al., 2016; Matsunaga et al., 2021; Wittkowski et al., 2010) and one factor models (Kaneko & Honjo's, 2014; Reck et al., 2006). Garcia-Esteve et al., (2016) recommend the use of a general factor, or total score for identifying overall bonding problems. Based on the lack of psychometric value, the risk of abuse subscale was not selected in the majority of these studies. The risk of abuse subscale has produced low sensitivity for identifying clinically significant anger in mothers towards their babies (Brockington et al., 2006), and has raised concerns about false positives in mothers with obsessional problems. Concerns about whether mothers would report intentions to harm their babies were also noted (Wittkowski et al., 2010).

Studies performing common factor analysis and exploratory factor analysis, as summarised in a recent systematic review, examine the psychometric status of the PBQ and attribute the differences in models to populations, samples, methodologies, translations and nuances of culture (Ghahremani et al., 2019). Reviewers noted that none of included studies reported how they dealt with missing values. Ghahremani et al. (2019) reflect that despite the lack of consistency between foreign language versions of the PBQ, the 25-item measure is psychometrically valid for screening for early mother infant bonding problems. In a review of antenatal and postnatal self-report measures of the parent-infant relationship, Wittkowski

and colleagues (2020) found that sufficient structural validity was only found for the PBQ-22 (Wittkowski et al., 2010). This model of the PBQ excludes risk of abuse item 18 ('I have done harmful things to my baby'), item 24 ('I feel like hurting my baby'), and item 23 ('I feel the only solution is for someone else to look after my baby') due to having insufficient loading in their exploratory factor analysis. The PBQ-22 has three subscales: Impaired bonding (1, 2, 3, 4, 6, 9, 10, 11, 16); rejection and anger (5, 7, 8, 13, 14, 15, 17, 21); and anxiety about care (12, 19, 20, 22, 25). Wittkowski and colleagues' (2010) study supports a three factor solution, whilst the total score was shown to be significantly correlated to the subscales. Brockington et al., (2006) and Wittkowski et al., (2007) supported use of the total PBQ score for assessing severity of bonding difficulties. The exclusion of risk of abuse items was also required following ethical review of the study.

All PBQ psychometric studies examined samples of women within one year postpartum, most often 1-4 months postpartum. In keeping with NICE guidelines, (NICE, 2018) perinatal services in all nations of the UK have been promised funding to provide services up to 2-years postnatal (Howard & Khalifeh, 2020). With this in mind the data of the 5.4% (N=16) of those between 12-18 months postnatal were retained for analysis.

*Patient Health Questionnaire (PHQ-9)*

The Patient Health Questionnaire is a 9-item self-report screening tool for assessing depression (Kroenke et al., 2001). The PHQ-9 required respondents to rate how often they experience symptoms on a four-point likert scale between '0- Not at all' and '3- Nearly Every Day'. Total scores can be calculated on a scale of 0-27. The measure has been extensively validated to have good construct validity, excellent reliability and diagnostic accuracy (Martin et al., 2006; Diez-Quevedo et al., 2001; Kocalevent et al. 2013), and is widely used in research and clinical practice as a one-factor model (Lamela et al., 2020; Boothroyd et al., 2019). The diagnostic accuracy of the PHQ-9 for identifying perinatal depression has been established (Wang et al., 2021).

## Data Screening

Participant data for the ITQ contained 0.55% missing values (29 individual item scores). Little's MCAR test was performed to test the null hypothesis that these data were 'missing completely at random' (Chi-Square: 122.376, DF: 153 , Sig. 0.967). Following a non-significant result (data was missing at random), the expectation- maximisation single imputation procedure was used to complete missing values (IBM SPSS Statistics 27). This was completed in subscale groupings to increase the accuracy of the imputed values. This approach was consistent with Murphy et al. (2020). The diagnostic status of participants did not change based on imputation procedures.

Participant data for the PBQ contained 0.22% missing values (14 individual item scores). Little's MCAR test was performed and found to be non-significant (Chi-Square: 209.513, DF: 209 , Sig. 0.477). The same imputation procedure was followed. PBQ scores skewed negatively with an average score of 19.25 (SD: 14.98, median: 16).

Participant data for the PHQ-9 contained 13 cases in which the PHQ-9 was blank – meaning a missing data rate of 4.42%. Missing values could not be computed, as more than 20% of responses were missing (Kocalevent, et al., 2013). Of those who did complete the questionnaire there was a 0.04% missing value rate (1 individual item score). Little's MCAR test was non-significant (Chi-Square: 17.825, DF: 16 , Sig. 0.334). Imputation was completed for that missing value.

## Data Analysis

To address hypotheses regarding group differences (i.e., between PTSD, CPTSD, DSO, and no trauma disorder), a non-parametric Kruskal-Wallis H test was performed with a Bonferroni correction applied to account for the potential impact of multiple comparisons and the risk of making a type 1 error. A non-parametric test was selected due to data in the non-trauma disorder symptom group not conforming to a normal distribution - a Shapiro-Wilk test had was significant and Q-Q plots were not a good fit. Furthermore there were a number of outliers present in PBQ scores in the non-trauma symptom group. Post-hoc analyses were then performed to examine specific effects between groups. The no trauma disorder group were treated as the reference group in all analyses. Given the novelty of the research, exploratory analyses also compared the three clinical groups against each other.

To explore the relative relationship between variables, path analysis was performed using MPlus (Version 8.1; Muthén and Muthén, 1998–2023) to examine direct relationships between PTSD, DSO and bonding difficulties, and indirect relationships between PTSD, DSO and bonding difficulties, via depression. A bootstrapping procedure was included in the analysis to estimate standard errors and confidence intervals. Test assumptions were examined between variables. Due to missing values on the depression questionnaire (PHQ-9), the analysis sample reduced to (N=281). This sample size was considered to be sufficient for the model with over 20 participants per variable (Kline, 2016).

## Results

### *Rates of Clinically Significant PTSD, CPTSD and DSO*

The majority of the sample, 68.7% (n=202) did not report clinically significant trauma symptoms on the ITQ. The rate of probable CPTSD was 10.9% (n=32), PTSD was 5.4% (n=16), and those meeting criteria for DSO symptoms was 15% (n=44). Thus, 16.3% of women in this sample met the clinical criteria for PTSD/CPTSD.

### *Rates of Traumatic Events*

The worst traumatic event that women were exposed to was reported qualitatively on the ITQ and then categorised according to the Life Events Checklist-5 criteria (Gray et al., 2004; see *Table 2*). The largest group of traumatic experiences reported in the current sample were categorised as ‘any other very stressful event or experience on the LEC-5 (34%, N= 100). This category contained traumatic experiences such as childhood psychological abuse, childhood neglect and exposure to long-term parental psychological abuse. This was followed by ‘Life-threatening illness or injury’ (18%, N = 53); ‘Sexual assault’ (10.5%,N=31); and ‘Physical Assault’ (8.4%, N=24). Birth or pregnancy-related traumatic experiences (e.g., miscarriage, traumatic birth, stillbirth) made up a minority of the worst exposure to a traumatic event that women reported (8.8%, N=26). Just over one in five participants did not report a worst traumatic experience (21.4%, N= 63).Of the N = 63 women who did not report an exposure to a traumatic event N = 53, (84.1%) were in the no trauma disorder group; N = 1 (1.6%) in the CPTSD group;  N = 2 (3.2%) were in the PTSD group; and N = 7 (11.1%) were in the DSO group.

*Table 2. The worst traumatic event reported on the ITQ*

| ITQ Diagnostic Status Across Sample (N/%) | | Full sample<br>N = 294 (100%) | Complex Post- Traumatic Stress Disorder (CPTSD)<br>N = 32 (10.9%) | Post- Traumatic Stress Disorder (PTSD)<br>N = 16 (5.4%) | Disturbance of Self-Organisation (DSO) only<br>N = 44 (15%) | No trauma diagnosis<br>N = 202 (68.7%) |
|---|---|---|---|---|---|---|
| **Traumatic events reported on ITQ based on LEC-5 coding per group** | Any other very stressful event or experience* | 100 (34%) | 12 (37.5%) | 7 (43.8%) | 14 (31.8%) | 67 (33.2%) |
| | Not reported** | 66 (22.4%) | 1 (3.1%) | 2 (12.5%) | 7 (15.9%) | 56 (27.7%) |
| | Life-threatening illness or injury | 53 (18%) | 4 (12.5%) | 3 (18.8%) | 8 (18.2%) | 38 (18.8%) |
| | Sexual assault | 31 (10.5%) | 9 (28.1%) | 2 (12.5%) | 3 (6.8%) | 17 (8.4%) |
| | Physical assault | 24 (8.2%) | 4 (12.5%) | 0 (0%) | 8 (18.2%) | 12 (5.9%) |
| | Severe Human Suffering | 7 (2.4%) | 0 (0%) | 1 (6.3%) | 2 (4.5%) | 4 (2%) |
| | Sudden violence death | 7 (2.4%) | 0 (0%) | 0 (0%) | 2 (4.5%) | 5 (2.5%) |
| | Sudden accidental death | 3 (1%) | 2 (6.3%) | 0 (0%) | 0 (0%) | 1 (0.5%) |
| | Assault with a weapon | 1 (0.3%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (0.5%) |
| | Other unwanted or uncomfortable sexual experience | 1 (0.3%) | (0%) | 1 (6.3%) | 0 (0%) | 0 (0%) |
| | Combat or exposure to a war-zone | 1 (0.3%) | 0 (0%) | 0 (0%) | 0 (0%) | 1 (0.5%) |
| **Birth or pregnancy- related trauma reported on ITQ (e.g. miscarriage, traumatic birth, stillbirth) per group** | | **26 (8.8%)** | **5 (15.6%)** | **2 (12.5%)** | **1 (2.3%)** | **18 (8.9%)** |

*Examples include childhood psychological abuse, neglect, witnessing long-term parental psychological abuse

**Where trauma not reported, participants confirmed they had been trauma exposed

*Traumatic Stress and Postnatal Bonding*

Data for group comparisons was found to not meet parametric assumptions. Therefore a Kruskal-Wallis H test was run to determine if there were differences in PBQ score between four groups of participants meeting criteria for PTSD (n=16), CPTSD (n=32), DSO only (n=44), and no trauma diagnosis (n=202). Distributions of PBQ scores were dissimilar for all groups, as assessed by visual inspection of a boxplot and therefore ranked mean scores were used rather than ranked median scores. The distributions of PBQ scores were significantly different between groups, ($\chi2(3) = 25.159$, p = < .001 DF=3).

Pairwise comparisons were performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons to examine where differences occurred. All values were compared exploratively. Mean ranks are reported alongside adjusted p-values. This post hoc analysis revealed statistically significant differences in PBQ scores between PTSD (mean rank: 121.5) and CPTSD (192.84) (p= 0.037); no trauma diagnosis (15.00) and DSO only

(25) (p= 0.001); no trauma diagnosis (15.00) and CPTSD (192.84) (p= 0.002). All other comparisons were non-significant. Means and standard deviations of PBQ scores are present in *Table. 3*.

*Table 3. Summary of scores on the Postpartum Bonding Questionnaire (PBQ), means and standard deviations*

| Mean / (SD) | **CPTSD** | **PTSD** | **DSO** | **No Trauma Disorder** |
|---|---|---|---|---|
| **PBQ Total** | 29.59 (21.02) | 15.07 (12.81) | 25.41 (14.96) | 16.60 (12.85) |
| **PBQ Subscale 1 Impaired bonding** | 11.06 (8.90) | 5.25 (6.02) | 9.39 (7.31) | 5.58 (5.60) |
| **PBQ Subscale 2 Rejection and anger** | 9.50 (7.40) | 4.75 (5.54) | 8.70 (5.69) | 5.60 (5.37) |
| **PBQ Subscale 3 Anxiety about care** | 9.03 (5.94) | 5.06 (3.49) | 7.32 (3.99) | 5.52 (3.13) |

*Traumatic Stress and Depression*

Group differences in depression were examined. Of the total sample with complete PHQ-9 scores (n=281), 32.7% (n=92) met the PHQ-9 threshold for probable depression. Caseness rates were 14.9% for the no trauma disorder group; 87.5% of the CPTSD group; 43.8% of the PTSD group; and 61.4% of the DSO-only group. Significant differences in the grouped distributions of depression scores were found ($\chi 2(3) = 107.217$, p = < 0.01, DF=3). All symptom cluster groups were found to have significantly increased depression scores than those not meeting clinical trauma symptoms (mean rank: 5.26): CPTSD (17.38; *p*= < 0.001), PTSD (8.88; *p*= 0.031), DSO only (13.26; <0.001). The CPTSD group also showed significantly higher depression scores than the PTSD group (*p*= 0.034). PTSD and DSO (*p*= 0.372), and DSO and CPTSD (*p*= 1) comparisons were non- significant.

*Correlations Between Psychological Variables*

Associations between psychological variables were examined by Pearson's correlations (*Table 4.*). All variables were significantly correlated with exception to PTSD and bonding difficulties (PBQ). A strong correlation was found between depression and bonding difficulties (PBQ) (*r* = .49), whilst a moderate correlation was found between DSO and bonding difficulties (*r* = .47). A small and non-significant correlation was found between PTSD symptoms and bonding difficulties (*r* = .11; p= .056). Strong correlations were also found between other psychological variables: PTSD and DSO symptoms (*r* = .59); PTSD and depression symptoms (PHQ) (*r* = .53); and DSO and depression symptoms (*r* = .77).

*Table 4. Correlations Between Variables*

| Symptom Scores | PTSD | DSO | PHQ | PBQ |
|---|---|---|---|---|
| 1. PTSD | - | .59** | .53** | .11 |
| 2. DSO | .59** | - | .77** | .47** |
| 3. PHQ | .53** | .77** | - | .49** |
| 4. PBQ | .11 | .47** | .49** | - |

** *P* = < 0.01

*Path Analysis*

To examine the relative variance between variables, a path analysis model was constructed with PTSD and DSO as exogenous variables with direct paths to bonding. To examine indirect relationships via depression, paths were constructed with depression is an endogenous, mediator, variable. See *Figure 2*. Depression is treated as a mediator in line with previous literature. Standarised coefficients, *P* values, standard errors and confidence intervals are shown in *Table 5*, including direct and indirect paths.

The model was saturated and therefore model fit statistics could not be interpreted ($\chi 2 = 0$, $p = 1$, DF = 0; CFI = 1; TLI = 1; SRMR = 0) (Streiner, 2005). Expert statistical advice was sought to ensure path coefficients, direct, indirect, and total effects were interpretable despite saturation (Christian Geiser, personal communication, 23rd August 2023). The model explained 50.1% of variance in depression symptoms and 28.5% of variance in postnatal bonding.

There were significant direct paths from DSO to postnatal bonding (0.437; $p = < 0.01$) and depression and postnatal bonding (0.256; $p = < 0.01$). There was a positive relationship between PTSD and bonding (-0.273; $p = < 0.01$). There was a significant indirect relationship between DSO and bonding via depression (0.169; $p = < 0.01$) and a non-significant indirect effects from PTSD to bonding via depression (0.020; $p = 0.213$). There was a significant relationship between DSO and depression (0.659; $p = < 0.01$), but a non-significant relationship between PTSD and depression (0.659; $p = < 0.01$). PTSD and DSO covaried significantly (0.583; $p = < 0.01$).

*Figure 2. Path model*

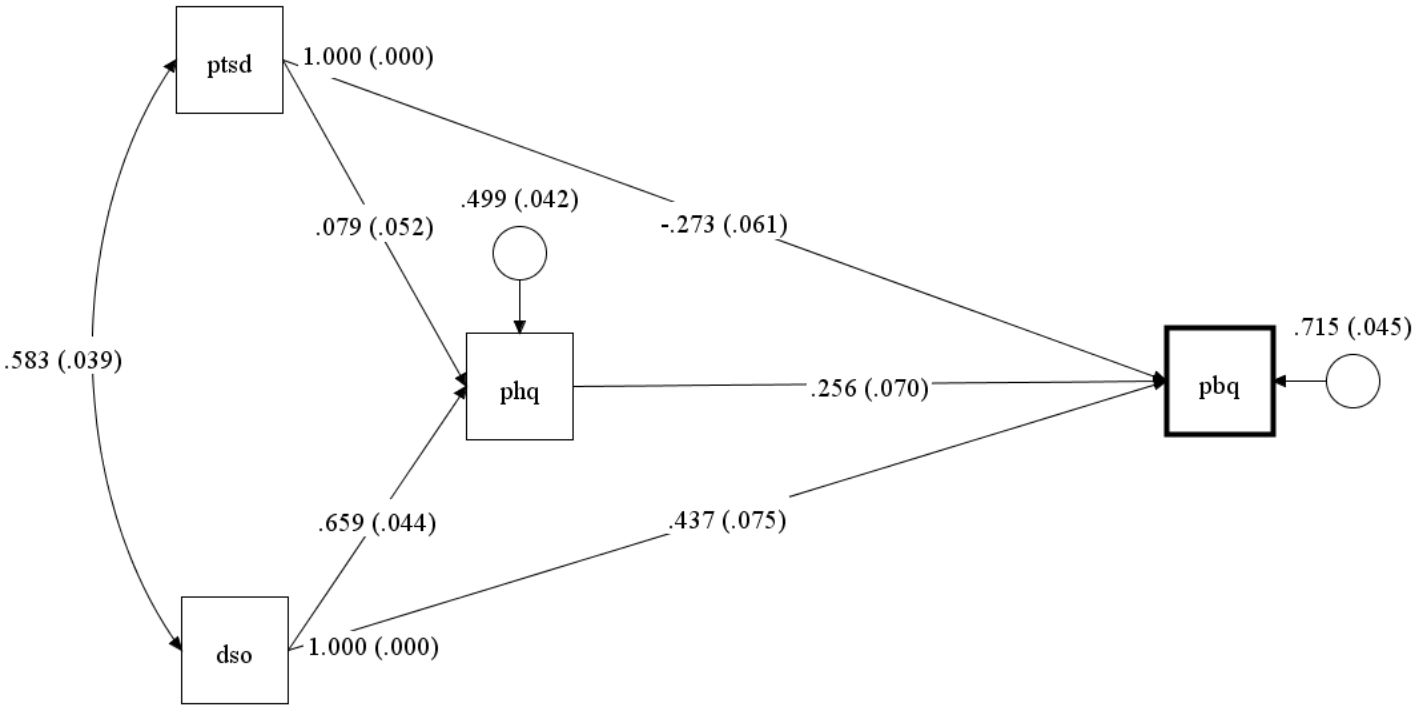



*Table 5. Standardised path analysis model estimates for direct (N= 294) and indirect relationships between PTSD, DSO and Postnatal Bonding, with depression as a mediating factor (N= 281)*

| Relationships modelled | Path Estimates | Standard Error | *P* Values | Lower 95% CI | Upper 95% CI |
|---|---|---|---|---|---|
| **Direct effects** | | | | | |
| PTSD → Postnatal Bonding | -0.273 | 0.061 | < 0.01 | -0.394 | -0.148 |
| DSO → Postnatal Bonding | 0.437 | 0.075 | < 0.01 | 0.299 | 0.548 |
| Depression → Postnatal Bonding | 0.256 | 0.070 | < 0.01 | 0.135 | 0.405 |
| PTSD → Depression | 0.079 | 0.050 | 0.112 | -0.003 | 0.162 |
| DSO → Depression | 0.659 | 0.063 | < 0.01 | 0.551 | 0.756 |
| **Indirect Effects via depression** | | | | | |
| PTSD → Depression → Postnatal Bonding | 0.020 | 0.036 | 0.213 | -0.001 | 0.051 |
| DSO → Depression → Postnatal Bonding | 0.169 | 0.113 | < 0.01 | 0.084 | 0.287 |
| **Covariance amongst exogenous variables** | | | | | |
| PTSD ↔ DSO | 0.583 | 0.044 | < 0.01 | 0.507 | 0.649 |

CI = Confidence interval; < = less than; ↔ = covariation; → = path model direction

## Discussion

The present study examined the relationships between symptoms of CPTSD, PTSD and depression on perceived mother-infant bonding. The hypotheses that increased bonding difficulties would be observed in those with clinically significant symptoms of CPTSD and DSO compared to the no trauma disorder reference group were supported. However, women with probable PTSD were not found to differ significantly from the no trauma disorder group. Exploratory group analyses showed women with CPTSD reported significantly more bonding problems than women with PTSD. Hypotheses predicting depression scores to be elevated in clinical symptoms groups were supported.

The path analysis tested a model in which PTSD and DSO symptoms had direct effects on postnatal bonding difficulties and indirect effects mediated by depression. The model showed significant direct effects of DSO and depression symptoms on postnatal bonding difficulties, and significant indirect path between DSO and bonding via depression. Based on the data available, hypotheses were supported that DSO symptoms have significant effects on postnatal bonding, and are mediated by depression. The hypothesis that PTSD would be associated with bonding problems was not supported, directly or indirectly. Unexpectedly, the model showed PTSD symptoms were negatively associated with bonding problems (i.e. elevated PTSD symptoms predicted decreased postnatal bonding difficulties). The model also suggested that DSO and depression covary significantly. It should be noted that path analysis can be used to test complex relationships between variables, but cannot infer causality.

These findings add to the literature directly linking postnatal depression and perceived mother-infant bonding (Tichelman et al., 2019; Cuijlits et al., 2019; Slomian et al., 2019; Rossen et al., 2019; Cinisomo et al., 2018). However the hypothesis that PTSD symptoms are associated with greater bonding difficulties was not supported either directly or indirectly, via depression. Although evidence is mixed, this finding is generally contrary to the majority of studies of PTSD and mother-infant bonding (Cook et al., 2018; Simpson et al., 2018; Erickson et al., 2019) and those that suggest a mediation role for depression between PTSD and bonding (Radoš et al., 2020; Parfitt & Ayers, 2009). It has been suggested that mothers with PTSD may seek to compensate for a perceived threat to bonding by seeking proximity and closeness to their infants (Radoš et al., 2020; Lara-Cinisomo et al., 2018). Cook et al., (2018) also considered the possibility that mothers with PTSD may feel more judged and complete self-report measures in a socially desirability manner. This may explain mixed findings in prior research, and merits further replication.

The PBQ has been shown to be sensitive in detecting bonding difficulties in perinatal women (Brockington et al., 2001; Brockington et al., 2006), however concerns about awareness in some clinical groups have been reported. Personality disorder traits in perinatal women have been associated with reduced maternal-infant sensitivity using an observational tool, but not with perceived mother-infant bonding problems rated on the PBQ (Nath et al., 2020). This effect diminished and was non- significant when controlling for depression symptoms, implying that depression may account for some of this effect. The disparity between observed and self-reported mother-infant relationship measures may be relevant to the present study given the recognition of overlapping symptom profiles between PTSD, CPTSD and Borderline Personality Disorder (BPD) (Jowett et al., 2020; Ford & Courtois, 2021). Therefore there may be a risk of underreporting bonding difficulties in clinical groups in the present study.

The finding that DSO symptoms, and not PTSD symptoms, were significantly associated with bonding problems is a unique contribution of this study. As is the finding that DSO had both direct and indirect impacts on bonding, mediated by depression. Furthermore, significantly higher bonding impairment in the DSO-only group, compared to the reference group, suggests there may a cohort of those who do meet criteria for PTSD (and therefore nor CPTSD) who are vulnerable to bonding difficulties and may require intervention. The significance of this is further highlighted by evidence that, compared to PTSD, DSO symptoms are more strongly associated with the transmission of traumatic stress to spouses (Bachem et al., 2021); negatively associated with post-traumatic hedonic and eudaimonic well-being (Li et al., 2023); and are observed to be extremely common and impairing in clinical practice (Cloitre et al., 2011).

Previous studies of the impact of PTSD on mother-infant relationships and bonding utilised measures based on diagnostic formulations of PTSD that are broader than the ICD-11 criteria such as DSM-5. For example, Radoš et al., (2020) used the DSM-5-based City Birth Trauma Scale (Ayers, Wright & Thronton, 2018) which contains items (e.g. ‘Feeling detached from other people’) that align to DSO-items on the ITQ (e.g. ‘I feel distant or cut off from people’; Cloitre et al., 2018). Furthermore, previous studies have suggested emotional numbing, reduced sensitivity and responsiveness as possible mechanisms for poorer postnatal bonding in those with PTSD (Erickson et al., 2019). The DSO ‘affective dysregulation’ subscale of the ITQ contains both hypo and hyperactivation items. Thus detecting relative sources of variance from DSO-like symptoms may be subsumed by total PTSD scores and therefore there is a risk of misattribution.

The findings of this study suggest the importance of detecting and examining the impacts of DSO symptoms in further research as such symptoms are likely to cause unique impacts and require specific interventions in the perinatal period (Nestgaard Rød & Schmidt, 2021; May et al. 2023; Coventry et al., 2020). The use of strict PTSD and CPTSD diagnostic criteria in clinical assessments may run the risk of under-detecting the treatment needs of those with DSO-only symptoms. This symptom cluster has been found to be associated with significant distress and impairment (Cloitre et al., 2011; Karatzias et al., 2017). If independent DSO symptoms are not detected and addressed early in the perinatal period, they may have impacts on mother-infant bonding outcomes and, subsequently, on infant development. Although further research is required to understand the impact of DSO symptomology on bonding. Further research would be strengthened by the use of structured clinical interviews, which would improve diagnostic accuracy and the robustness of the reported symptom variables. Longitudinal designs would provide further insight into the relationship between bonding difficulties, PTSD, CPTSD and depression symptoms.

**Limitations**

Limitations of this study include the use of self-report measures rather than observational or structured interview tools. Thus, despite using validated measures, the present study reports perceived bonding. The present study focused on PTSD, CPTSD and depression, however, there may have been other psychiatric comorbidities that were not assessed. Although the prevalence of PTSD at 3 months and 6 months postnatal have been shown to be relatively stable (Yildiz et al., 2017), the present study was limited by a cross- sectional design. Cook et al., (2018) highlight the importance of longitudinal designs for the measurement of parent-infant relationships and the expression of PTSD symptoms over time. Furthermore, path analysis is not able to infer causation, only test theoretically driven models. Examining subscales of the Postpartum Bonding Questionnaire may elucidate the impacts of specific CPTSD and PTSD symptomology on mother-infant bonding. Finally, it is notable that the sample was a majority highly- educated, coupled, employed, heterosexual and on their first or second child, the generalisability of these results may therefore be limited.

## Footnotes

*Declarations of interest*

None

*Contributions*

Adam Joshua Cann - Conceptualization; data curation; formal analysis; methodology
Professor Neil Roberts - Supervision
Dr. Cerith Waters – Supervision

*Funding*

The study is hosted by the National Centre for Mental Health (NCMH), a Health and Care Research Wales and Welsh Government funded research collaboration between Cardiff, Swansea, and Bangor Universities. Study completed within South Wales Doctoral Programme in Clinical Psychology, School of Psychology, Cardiff University.

## References

Ayers, S., Wright, D.B., Thornton, A., 2018. Development of a measure of postpartum PTSD: The city birth trauma scale. Front. Psychiatry 9, 1–8. https://doi.org/10.3389/fpsyt.2018.00409

Ayers, S., Wright, D. B., & Wells, N. (2007). Symptoms of post-traumatic stress disorder in couples after birth: Association with the couple's relationship and parent–baby bond. Journal of Reproductive and Infant Psychology, 25(1), 40–50. https://doi.org/10.1080/02646830601117175

Bachem, R., Levin, Y., Zerach, G., Cloitre, M., & Solomon, Z. (2021). The interpersonal implications of PTSD and complex PTSD: The role of disturbances in self-organization. Journal of Affective Disorders, 290, 149–156. https://doi.org/10.1016/j.jad.2021.04.075

Badr, L. K., Ayvazian, N., Lameh, S., & Charafeddine, L. (2018). Is the Effect of Postpartum Depression on Mother-Infant Bonding Universal? Infant Behavior and Development, 51, 15–23. https://doi.org/10.1016/j.infbeh.2018.02.003

Bauer, A., Pawlby, S., Dominic, T. P., King, D., Pariante, C. M. & Knapp, M. (2014) Perinatal depression and child development: exploring the economic consequences from a South London cohort, Psychological Medicine, published online 23rd June 2014.

Behrendt, H. F., Konrad, K., Goecke, T. W., Fakhrabadi, R., Herpertz-Dahlmann, B., & Firk, C. (2016). Postnatal Mother-to-Infant Attachment in Subclinically Depressed Mothers: Dyads at Risk? Psychopathology, 49(4), 269–276. https://doi.org/10.1159/000447597

Boothroyd, L., Dagnan, D., & Muncer, S. (2019). PHQ-9: One factor or two? Psychiatry Research, 271, 532–534. https://doi.org/10.1016/j.psychres.2018.12.048

Bosquet Enlow, M., Kitts, R. L., Blood, E., Bizarro, A., Hofmeister, M., & Wright, R. J. (2011). Maternal posttraumatic stress symptoms and infant emotional reactivity and emotion regulation. Infant Behavior and Development, 34(4), 487–503. https://doi.org/10.1016/j.infbeh.2011.07.007

Brockington. I., F. (1996) Motherhood and mental health. Oxford University Press, Oxford, pp 327–366 (disorders of the mother infant relationship), pp 584–590 (interview)

Brockington, I. F., Fraser, C., & Wilson, D. (2006). The Postpartum Bonding Questionnaire: A validation. Archives of Women's Mental Health, 9(5), 233–242. https://doi.org/10.1007/s00737-006-0132-1

Brockington, I. F., Oates, J., George, S., Turner, D., Vostanis, P., Sullivan, M., Loh, C., & Murdoch, C. (2001). A Screening Questionnaire for mother-infant bonding disorders. Archives of Women's Mental Health, 3(4), 133–140. https://doi.org/10.1007/s007370170010

Busonera, A., Cataudella, S., Lampis, J., Tommasi, M., & Zavattini, G. C. (2017). Psychometric properties of the Postpartum Bonding Questionnaire and correlates of mother–infant bonding impairment in Italian new mothers. Midwifery, 55, 15–22. https://doi.org/10.1016/j.midw.2017.08.011

Cloitre, M., Courtois, C. A., Charuvastra, A., Carapezza, R., Stolbach, B. C., & Green, B. L. (2011). Treatment of complex PTSD: Results of the ISTSS expert clinician survey on best practices. Journal of Traumatic Stress, 24(6), 615–627. https://doi.org/10.1002/jts.20697

Cuijlits, I., van de Wetering, A. p., Endendijk, J. j., van Baar, A. l., Potharst, E. s., & Pop, V. j. m. (2019). Risk and protective factors for pre- and postnatal bonding. *Infant Mental Health Journal*, *40*(6), 768–785. https://doi.org/10.1002/imhj.21811

Cloitre, M., Shevlin M., Brewin, C.R., Bisson, J.I., Roberts, N.P., Maercker, A., Karatzias, T., Hyland, P. (2018). The International Trauma Questionnaire: Development of a self-report measure of ICD-11 PTSD and Complex PTSD. Acta Psychiatrica Scandinavica. 138(6), 536–546. https://doi.org/10.1111/acps.12956

Cloitre, M., Stolbach, B.C., Herman, J.L., Kolk, B.v.d., Pynoos, R., Wang, J. and Petkova, E. (2009), A developmental approach to complex PTSD: Childhood and adult cumulative trauma as predictors of symptom complexity. J. Traum. Stress, 22: 399-408. https://doi.org/10.1002/jts.20444

Cook, N., Ayers, S., & Horsch, A. (2018). Maternal posttraumatic stress disorder during the perinatal period and child outcomes: A systematic review. Journal of Affective Disorders, 225, 18–31. https://doi.org/10.1016/j.jad.2017.07.045

Coventry, P. A., Meader, N., Melton, H., Temple, M., Dale, H., Wright, K., Cloitre, M., Karatzias, T., Bisson, J., Roberts, N. P., Brown, J. V. E., Barbui, C., Churchill, R., Lovell, K., McMillan, D., & Gilbody, S. (2020). Psychological and pharmacological interventions for posttraumatic stress disorder and comorbid mental health problems following complex traumatic events: Systematic review and component network meta-analysis. PLOS MEDICINE, 34. 10.1371/journal.pmed.1003262

Davies, J., Slade, P., Wright, I., & Stewart, P. (2008). Posttraumatic stress symptoms following childbirth and mothers' perceptions of their infants. Infant Mental Health Journal, 29(6), 537–554. https://doi.org/10.1002/imhj.20197

Diez-Quevedo, C., Rangil, T., Sanchez-Planell, L., Kroenke, K., & Spitzer, R. L. (2001). Validation and Utility of the Patient Health Questionnaire in Diagnosing Mental Disorders in 1003 General Hospital Spanish Inpatients. Psychosomatic Medicine, 63(4), 679. https://journals.lww.com/psychosomaticmedicine/Abstract/2001/07000/Validation_and_Utility_of_the_Patient_Health.21.aspx

Erickson, N., Julian, M., & Muzik, M. (2019). Perinatal depression, PTSD, and trauma: Impact on mother–infant attachment and interventions to mitigate the transmission of risk.

International Review of Psychiatry, 31(3), 245–263. https://doi.org/10.1080/09540261.2018.1563529

Evans, H., Sadhwani, S., Singh, D. N., Robjant, D. K., & Katona, P. C. (2022). Prevalence of complex post-traumatic stress disorder in survivors of human trafficking and modern slavery: A systematic review. The European Journal of Psychiatry, 36(2), 94–105. https://doi.org/10.1016/j.ejpsy.2022.01.005

Feeley, N., Zelkowitz, P., Cormier, C., Charbonneau, L., Lacroix, A., & Papageorgiou, A. (2011). Posttraumatic stress among mothers of very low birthweight infants at 6 months after discharge from the neonatal intensive care unit. *Applied Nursing Research*, *24*(2), 114–117. https://doi.org/10.1016/j.apnr.2009.04.004

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. American Journal of Preventive Medicine, 14(4), 245–258. https://doi.org/10.1016/s0749-3797(98)00017-8

Ford, J. D., & Courtois, C. A. (2021). Complex PTSD and borderline personality disorder. Borderline Personality Disorder and Emotion Dysregulation, 8(1), 16. https://doi.org/10.1186/s40479-021-00155-9

Frost, R., Vang, M. L., Hyland, P., Shevlin, M., McCarthy, A., & Murphy, J. (2022). Assessing the factorial validity and the internal reliability of the International Trauma Questionnaire (ITQ); PTSD and complex PTSD among survivors of sexual violence in Ireland. Epidemiology and Psychiatric Sciences, 31, e42. https://doi.org/10.1017/S2045796022000245

Garcia-Esteve, L., Torres, A., Lasheras, G., Palacios Hernández, B., Farré-Sender, B., Subirá, S., Valdés, M., & Brockington, I. (2016). Assessment of psychometric properties of the Postpartum Bonding Questionnaire (PBQ) in Spanish mothers. *Archives of Women's Mental Health*, *19*. https://doi.org/10.1007/s00737-015-0589-x

Garthus-Niegel, S., Ayers, S., Martini, J., Von Soest, T., & Eberhard-Gran, M. (2017). The impact of postpartum post-traumatic stress disorder symptoms on child development: A population-based, 2-year follow-up study. Psychological Medicine, 47(1), 161–170. Scopus. https://doi.org/10.1017/S003329171600235X

Garthus-Niegel, S., Horsch, A., Ayers, S., Junge-Hoffmeister, J., Weidner, K., & Eberhard-Gran, M. (2018). The influence of postpartum PTSD on breastfeeding: A longitudinal population-based study. Birth, 45(2), 193–201. Scopus. https://doi.org/10.1111/birt.12328

Gavin, N. I., Gaynes, B. N., Lohr, K. N., Meltzer-Brody, S., Gartlehner, G., & Swinson, T. (2005). Perinatal Depression: A Systematic Review of Prevalence and Incidence. Obstetrics & Gynecology, 106(5 Part 1), 1071. https://doi.org/10.1097/01.AOG.0000183597.31630.db

Garthus-Niegel, S., Horsch, A., Handtke, E., Von Soest, T., Ayers, S., Weidner, K., & Eberhard-Gran, M. (2018). The Impact of Postpartum Posttraumatic Stress and Depression Symptoms on Couples' Relationship Satisfaction: A Population-Based Prospective Study. Frontiers in Psychology, 9, 1728. https://doi.org/10.3389/fpsyg.2018.01728

Gray, M., Litz, B., Hsu, J., & Lombardo, T. (2004). Psychometric properties of the Life Events Checklist. Assessment, 11, 330-341. doi: https://10.1177/1073191104269954

Grekin, R., & O'Hara, M. W. (2014). Prevalence and risk factors of postpartum posttraumatic stress disorder: A meta-analysis. Clinical Psychology Review, 34(5), 389–401. https://doi.org/10.1016/j.cpr.2014.05.003

Hairston, I., E. Handelzalts, J., Assis, C., & Kovo, M. (2018). Postpartum Bonding Difficulties and Adult Attachment Styles: The Mediating Role of Postpartum Depression and Childbirth-Related Ptsd. Infant Mental Health Journal, 39(2), 198–208. https://doi.org/10.1002/imhj.21695

Hayes, L. J., Goodman, S. H., & Carlson, E. (2013). Maternal antenatal depression and infant disorganized attachment at 12 months. Attachment & Human Development, 15(2), 133–153. https://doi.org/10.1080/14616734.2013.743256

Hailemeskel, H. S., Kebede, A. B., Fetene, M. T., & Dagnaw, F. T. (2022). Mother-Infant Bonding and Its Associated Factors Among Mothers in the Postpartum Period, Northwest

Ethiopia, 2021. Frontiers in Psychiatry, 13, 893505. https://doi.org/10.3389/fpsyt.2022.893505

Ho, G. W. K., Hyland, P., Shevlin, M., Chien, W. T., Inoue, S., Yang, P. J., Chen, F. H., Chan, A. C. Y., & Karatzias, T. (2020). The validity of ICD-11 PTSD and Complex PTSD in East Asian cultures: Findings with young adults from China, Hong Kong, Japan, and Taiwan. European Journal of Psychotraumatology, 11(1), 1717826. https://doi.org/10.1080/20008198.2020.1717826

Howard, L. M., & Khalifeh, H. (2020). Perinatal mental health: A review of progress and challenges. World Psychiatry, 19(3), 313–327. https://doi.org/10.1002/wps.20769

Hyland, P., Murphy, J., Shevlin, M., Vallières, F., McElroy, E., Elklit, A., Christoffersen, M., & Cloitre, M. (2017). Variation in post-traumatic response: The role of trauma type in predicting ICD-11 PTSD and CPTSD symptoms. Social Psychiatry and Psychiatric Epidemiology, 52(6), 727–736. https://doi.org/10.1007/s00127-017-1350-8

Hyland, P., Shevlin, M., & Brewin, C. R. (2023). The memory and identity theory of ICD-11 complex posttraumatic stress disorder. Psychological Review, 130(4), 1044–1065. https://doi.org/10.1037/rev0000418

Hyland, P., Vallières, F., Cloitre, M., Ben-Ezra, M., Karatzias, T., Olff, M., Murphy, J., & Shevlin, M. (2021). Trauma, PTSD, and complex PTSD in the Republic of Ireland: Prevalence, service use, comorbidity, and risk factors. Social Psychiatry and Psychiatric Epidemiology, 56(4), 649–658. https://doi.org/10.1007/s00127-020-01912-x

Ionio, C., & Di Blasio, P. (2014). Post-traumatic stress symptoms after childbirth and early mother–child interactions: An exploratory study. Journal of Reproductive and Infant Psychology, 32(2), 163–181. https://doi.org/10.1080/02646838.2013.841880

Jowett, S., Karatzias, T., Shevlin, M., & Albert, I. (2020). Differentiating symptom profiles of ICD-11 PTSD, complex PTSD, and borderline personality disorder: A latent class analysis in a multiply traumatized sample. Personality Disorders: Theory, Research, and Treatment, 11(1), 36–45. https://doi.org/10.1037/per0000346

Kaneko, H., & Honjo, S. (2014). The Psychometric Properties and Factor Structure of the Postpartum Bonding Questionnaire in Japanese Mothers. *Psychology*, *05*(09), 1135–1142. https://doi.org/10.4236/psych.2014.59126

Karatzias, T., Hyland, P., Bradley, A., Cloitre, M., Roberts, N. P., Bisson, J. I., & Shevlin, M. (2019). Risk factors and comorbidity of ICD-11 PTSD and complex PTSD: Findings from a trauma-exposed population based sample of adults in the United Kingdom. Depression and Anxiety, 36(9), 887–894. https://doi.org/10.1002/da.22934

Karatzias, T., Shevlin, M., Ford, J. D., Fyvie, C., Grandison, G., Hyland, P., & Cloitre, M. (2021). Childhood trauma, attachment orientation, and complex PTSD (CPTSD) symptoms in a clinical sample: Implications for treatment. Development and Psychopathology, 1–6. https://doi.org/10.1017/S0954579420001509

Karatzias, T., Shevlin, M., Hyland, P., Brewin, C. R., Cloitre, M., Bradley, A., Kitchiner, N. J., Jumbe, S., Bisson, J. I., & Roberts, N. P. (2018). The role of negative cognitions, emotion regulation strategies, and attachment style in complex post-traumatic stress disorder: Implications for new and existing therapies. The British Journal of Clinical Psychology, 57(2), Article 2. https://doi.org/10.1111/bjc.12172

Karatzias, T., Cloitre, M., Maercker, A., Kazlauskas, E., Shevlin, M., Hyland, P., Bisson, J. I., Roberts, N. P., & Brewin, C. R. (2017). PTSD and Complex PTSD: ICD-11 updates on concept and measurement in the UK, USA, Germany and Lithuania. European Journal of Psychotraumatology, 8(sup7), 1418103. https://doi.org/10.1080/20008198.2017.1418103

Kolk, T. A., Nath, S., Howard, L. M., Pawlby, S., Lockwood-Estrin, G., & Trevillion, K. (2021). The association between maternal lifetime interpersonal trauma experience and perceived mother-infant bonding. Journal of Affective Disorders, 294, 117–127. https://doi.org/10.1016/j.jad.2021.06.069

Kovács-Tóth, B., Oláh, B., Kuritárné Szabó, I., & Fekete, Z. (2023). Psychometric properties of the Adverse Childhood Experiences Questionnaire 10 item version (ACE-10) among Hungarian adolescents. Frontiers in Psychology, 14, 1161620. https://doi.org/10.3389/fpsyg.2023.1161620

Lamela, D., Soreira, C., Matos, P., & Morais, A. (2020). Systematic review of the factor structure and measurement invariance of the patient health questionnaire-9 (PHQ-9) and

validation of the Portuguese version in community settings. Journal of Affective Disorders, 276, 220–233. https://doi.org/10.1016/j.jad.2020.06.066

Lara-Cinisomo, S., Zhu, K., Fei, K., Bu, Y., Weston, A. P., & Ravat, U. (2018). Traumatic events: Exploring associations with maternal depression, infant bonding, and oxytocin in Latina mothers. BMC Women's Health, 18(1), 31. https://doi.org/10.1186/s12905-018-0520-5

Lavallée, A., Warmingham, J. M., Reimers, M. A., Kyle, M. H., Austin, J., Lee, S., Barker, T., Hussain, M., Ettinger, S., & Dumitriu, D. (2023). Factor Structure of the Postpartum Bonding Questionnaire in a US-Based Cohort of Mothers (p. 2023.04.09.23288334). medRxiv. https://doi.org/10.1101/2023.04.09.23288334

Li, D., Luo, J., Yan, X., & Liang, Y. (2023). Complex Posttraumatic Stress Disorder (CPTSD) as an Independent Diagnosis: Differences in Hedonic and Eudaimonic Well-Being between CPTSD and PTSD. Healthcare, 11(8), 1188. https://doi.org/10.3390/healthcare11081188

Lutkiewicz, K., Bieleninik, Ł., Cieślak, M., & Bidzan, M. (2020). Maternal–Infant Bonding and Its Relationships with Maternal Depressive Symptoms, Stress and Anxiety in the Early Postpartum Period in a Polish Sample. International Journal of Environmental Research and Public Health, 17(15), 5427. https://doi.org/10.3390/ijerph17155427

Kocalevent, R.-D., Hinz, A., & Brähler, E. (2013). Standardization of the depression screener Patient Health Questionnaire (PHQ-9) in the general population. General Hospital Psychiatry, 35(5), 551–555. https://doi.org/10.1016/j.genhosppsych.2013.04.006

Kline, R., B. (2016) *Principles and Practice of Structural Equation Modeling*. Fourth Edition. The Guilford Press: London.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9. Journal of General Internal Medicine, 16(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Ludmer, J. A., Gonzalez, A., Kennedy, J., Masellis, M., Meinz, P., & Atkinson, L. (2018). Association between maternal childhood maltreatment and mother-infant attachment disorganization: Moderation by maternal oxytocin receptor gene and cortisol secretion. Hormones and Behavior, 102, 23–33. https://doi.org/10.1016/j.yhbeh.2018.04.006

Madigan, S., Cyr, C., Eirich, R., Fearon, R. M. P., Ly, A., Rash, C., Poole, J. C., & Alink, L. R. A. (2019). Testing the cycle of maltreatment hypothesis: Meta-analytic evidence of the intergenerational transmission of child maltreatment. Development and Psychopathology, 31(1), 23–51. https://doi.org/10.1017/S0954579418001700

McDonald, S., Slade, P., Spiby, H., & Iles, J. (2011). Post-traumatic stress symptoms, parenting stress and mother-child relationships following childbirth and at 2 years postpartum. Journal of Psychosomatic Obstetrics & Gynecology, 32(3), 141–146. https://doi.org/10.3109/0167482X.2011.596962

Mason, Z. S., Briggs, R. D., & Silver, E. J. (2011). Maternal attachment feelings mediate between maternal reports of depression, infant social–emotional development, and parenting stress. Journal of Reproductive and Infant Psychology, 29(4), 382–394. https://doi.org/10.1080/02646838.2011.629994

Matsunaga, A., Ohashi, Y., Sakanashi, K., & Kitamura, T. (2021). Factor structure of the Postpartum Bonding Questionnaire: Configural invariance and measurement invariance across postpartum time periods. *Journal of Psychiatric Research*, *135*, 1–7. https://doi.org/10.1016/j.jpsychires.2020.11.017

Martin, A., Rief, W., Klaiberg, A., & Braehler, E. (2006). Validity of the Brief Patient Health Questionnaire Mood Scale (PHQ-9) in the general population. General Hospital Psychiatry, 28(1), 71–77. https://doi.org/10.1016/j.genhosppsych.2005.07.003

May, A., Balzan, R., Williams, A. S., Wade, T. D., & Paranjothy, S. M. (2023). Interventions for perinatal borderline personality disorder and complex trauma: A systematic review. Archives of Women's Mental Health, 26(3), 295–309. https://doi.org/10.1007/s00737-023-01313-4

McElwain, N. L., & Booth-LaForce, C. (2006). Maternal sensitivity to infant distress and nondistress as predictors of infant-mother attachment security. Journal of Family Psychology, 20(2), 247–255. https://doi.org/10.1037/0893-3200.20.2.247

Murphy, D., Shevlin, M., Pearson, E., Greenberg, N., Wessely, S., Busuttil, W., & Karatzias, T. (2020). A validation study of the International Trauma Questionnaire to assess post-traumatic stress disorder in treatment-seeking veterans. The British Journal of Psychiatry, 216(3), 132–137. https://doi.org/10.1192/bjp.2020.9

Muthén, L., K., & Muthén, B., O. (1998-2023). *MPlus8*. Version 8.1. Los Angeles, CA: Muthén & Muthén

Muzik, M., Morelen, D., Hruschak, J., Rosenblum, K. L., Bocknek, E., & Beeghly, M. (2017). Psychopathology and parenting: An examination of perceived and observed parenting in mothers with depression and PTSD. Journal of Affective Disorders, 207, 242–250. https://doi.org/10.1016/j.jad.2016.08.035

National Institute for Health and Care Excellence (NICE). (2018). Antenatal and postnatal mental health: Clinical management and service guidance. http://www.ncbi.nlm.nih.gov/books/NBK553127/

Nath, S., Pearson, R. M., Moran, P., Pawlby, S., Molyneaux, E., & Howard, L. M. (2020). Maternal personality traits, antenatal depressive symptoms and the postpartum mother–infant relationship: A prospective observational study. Social Psychiatry and Psychiatric Epidemiology, 55(5), 621–634. https://doi.org/10.1007/s00127-019-01790-y

Nestgaard Rød, Å., & Schmidt, C. (2021). Complex PTSD: What is the clinical utility of the diagnosis? European Journal of Psychotraumatology, 12(1), 2002028. https://doi.org/10.1080/20008198.2021.2002028

Nolvi, S., Karlsson, L., Bridgett, D. J., Pajulo, M., Tolvanen, M., & Karlsson, H. (2016). Maternal postnatal psychiatric symptoms and infant temperament affect early mother-infant bonding. Infant Behavior and Development, 43, 13–23. https://doi.org/10.1016/j.infbeh.2016.03.003

Ohashi, Y., Kitamura, T., Sakanashi, K., & Tanaka, T. (2016). Postpartum Bonding Disorder: Factor Structure, Validity, Reliability and a Model Comparison of the Postnatal Bonding Questionnaire in Japanese Mothers of Infants. *Healthcare (Basel, Switzerland)*, *4*(3), 50. https://doi.org/10.3390/healthcare4030050

O'Higgins, M., Roberts, I. S. J., Glover, V., & Taylor, A. (2013). Mother-child bonding at 1 year; associations with symptoms of postnatal depression and bonding in the first few weeks. Archives of Women's Mental Health, 16(5), 381–389. https://doi.org/10.1007/s00737-013-0354-y

Ostlund, B. D., Measelle, J. R., Laurent, H. K., Conradt, E., & Ablow, J. C. (2017). Shaping emotion regulation: Attunement, symptomatology, and stress recovery within mother–infant dyads. Developmental Psychobiology, 59(1), 15–25. https://doi.org/10.1002/dev.21448

Parfitt, Y., Pike, A., & Ayers, S. (2013). The impact of parents' mental health on parent–baby interaction: A prospective study. Infant Behavior and Development, 36(4), 599–608. https://doi.org/10.1016/j.infbeh.2013.06.003

Parfitt, Y. M., & Ayers, S. (2009). The effect of post-natal symptoms of post-traumatic stress and depression on the couple's relationship and parent–baby bond. Journal of Reproductive and Infant Psychology, 27(2), 127–142. https://doi.org/10.1080/02646830802350831

Parfitt, Y., Pike, A., & Ayers, S. (2014). Infant Developmental Outcomes: A Family Systems Perspective. Infant and Child Development, 23(4), 353–373. https://doi.org/10.1002/icd.1830

Raby, K. L., Labella, M. H., Martin, J., Carlson, E. A., & Roisman, G. I. (2017). Childhood abuse and neglect and insecure attachment states of mind in adulthood: Prospective, longitudinal evidence from a high-risk sample. Development and Psychopathology, 29(2), 347–363. https://doi.org/10.1017/S0954579417000037

Radoš, S. N., Matijaš, M., Anđelinović, M., Čartolovni, A., & Ayers, S. (2020). The role of posttraumatic stress and depression symptoms in mother-infant bonding. Journal of Affective Disorders, 268, 134–140. https://doi.org/10.1016/j.jad.2020.03.006

Reck, C., Klier, C. M., Pabst, K., Stehle, E., Steffenelli, U., Struben, K., & Backenstrass, M. (2006). The German version of the Postpartum Bonding Instrument: Psychometric properties and association with postpartum depression. *Archives of Women's Mental Health*, *9*(5), 265–271. https://doi.org/10.1007/s00737-006-0144-x

Rossen, L., Mattick, R. P., Wilson, J., Clare, P. J., Burns, L., Allsop, S., Elliott, E. J., Jacobs, S., Olsson, C. A., & Hutchinson, D. (2019). Mother–Infant Bonding and Emotional Availability at 12-Months of Age: The Role of Early Postnatal Bonding, Maternal Substance Use and Mental Health. Maternal and Child Health Journal, 23(12), 1686–1698. https://doi.org/10.1007/s10995-019-02809-1

Savage, L.-É., Tarabulsy, G. M., Pearson, J., Collin-Vézina, D., & Gagné, L.-M. (2019). Maternal history of childhood maltreatment and later parenting behavior: A meta-analysis. Development and Psychopathology, 31(1), 9–21. https://doi.org/10.1017/S0954579418001542

Schmid, B., Blomeyer, D., Buchmann, A. F., Trautmann-Villalba, P., Zimmermann, U. S., Schmidt, M. H., Esser, G., Banaschewski, T., & Laucht, M. (2011). Quality of early mother–child interaction associated with depressive psychopathology in the offspring: A prospective study from infancy to adulthood. Journal of Psychiatric Research, 45(10), 1387–1394. https://doi.org/10.1016/j.jpsychires.2011.05.010

Seng, J. S., Sperlich, M., Low, L. K., Ronis, D. L., Muzik, M., & Liberzon, I. (2013). Childhood Abuse History, Posttraumatic Stress Disorder, Postpartum Mental Health, and Bonding: A Prospective Cohort Study. Journal of Midwifery & Women's Health, 58(1), 57–68. https://doi.org/10.1111/j.1542-2011.2012.00237.x

Staudt, A., Baumann, S., Horesh, D., Eberhard-Gran, M., Horsch, A., & Garthus-Niegel, S. (2023). Predictors and comorbidity patterns of maternal birth-related posttraumatic stress symptoms: A Latent Class Analysis. Psychiatry Research, 320, 115038. https://doi.org/10.1016/j.psychres.2022.115038

Shevlin, M., Hyland, P., Karatzias, T., Fyvie, C., Roberts, N., Bisson, J. I., Brewin, C. R., & Cloitre, M. (2017). Alternative models of disorders of traumatic stress based on the new ICD-11 proposals. Acta Psychiatrica Scandinavica, 135(5), 419–428. https://doi.org/10.1111/acps.12695

Silva, U. de, Glover, N., & Katona, C. (2021). Prevalence of complex post-traumatic stress disorder in refugees and asylum seekers: Systematic review. BJPsych Open, 7(6), e194. https://doi.org/10.1192/bjo.2021.1013

Simpson, M., Schmied, V., Dickson, C., & Dahlen, H. G. (2018). Postnatal post-traumatic stress: An integrative review. Women and Birth, 31(5), 367–379. https://doi.org/10.1016/j.wombi.2017.12.003

Slomian, J., Honvo, G., Emonts, P., Reginster, J.-Y., & Bruyère, O. (2019). Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. Women's Health, 15, 1745506519844044. https://doi.org/10.1177/1745506519844044

Streiner, D. L. (2005). Finding Our Way: An Introduction to Path Analysis. The Canadian Journal of Psychiatry, 50(2), 115–122. https://doi.org/10.1177/070674370505000207

Suetsugu, Y., Honjo, S., Ikeda, M., & Kamibeppu, K. (2015). The Japanese version of the Postpartum Bonding Questionnaire: Examination of the reliability, validity, and scale structure. Journal of Psychosomatic Research, 79(1), 55–61. https://doi.org/10.1016/j.jpsychores.2015.02.008

Tichelman, E., Westerneng, M., Witteveen, A. B., Baar, A. L. van, Horst, H. E. van der, Jonge, A. de, Berger, M. Y., Schellevis, F. G., Burger, H., & Peters, L. L. (2019). Correlates of prenatal and postnatal mother-to-infant bonding quality: A systematic review. PLOS ONE, 14(9), e0222998. https://doi.org/10.1371/journal.pone.0222998

Tietz, A., Zietlow, A.-L., & Reck, C. (2014). Maternal bonding in mothers with postpartum anxiety disorder: The crucial role of subclinical depressive symptoms and maternal avoidance behaviour. Archives of Women's Mental Health, 17(5), 433–442. https://doi.org/10.1007/s00737-014-0423-x

Tokuda, N., Kobayashi, Y., Tanaka, H., Sawai, H., Shibahara, H., Takeshima, Y., Shima, M., Kamijima, M., Yamazaki, S., Ohya, Y., Kishi, R., Yaegashi, N., Hashimoto, K., Mori, C., Ito, S., Yamagata, Z., Inadera, H., Nakayama, T., Iso, H., Katoh, T. (2021). Feelings about pregnancy and mother-infant bonding as predictors of persistent psychological distress in the perinatal period: The Japan Environment and Children's Study. Journal of Psychiatric Research, 140, 132–140. https://doi.org/10.1016/j.jpsychires.2021.05.056

van Dijke, A., Ford, J. D., Frank, L. E., & van der Hart, O. (2015). Association of Childhood Complex Trauma and Dissociation With Complex Posttraumatic Stress Disorder Symptoms in Adulthood. Journal of Trauma & Dissociation, 16(4), 428–441. https://doi.org/10.1080/15299732.2015.1016253

Vang, M. L., Dokkedahl, S. B., Løkkegaard, S. S., Jakobsen, A. V., Møller, L., Auning-Hansen, M. A., & Elklit, A. (n.d.). Validation of ICD-11 PTSD and DSO using the International Trauma Questionnaire in five clinical samples recruited in Denmark. European Journal of Psychotraumatology, 12(1), 1894806. https://doi.org/10.1080/20008198.2021.1894806

Wang, L., Kroenke, K., Stump, T. E., & Monahan, P. O. (2021). Screening for perinatal depression with the Patient Health Questionnaire depression scale (PHQ-9): A systematic review and meta-analysis. General Hospital Psychiatry, 68, 74–82. https://doi.org/10.1016/j.genhosppsych.2020.12.007

Wingenfeld, K., Schäfer, I., Terfehr, K., Grabski, H., Driessen, M., Grabe, H., Löwe, B., & Spitzer, C. (2010). Reliable, valide und ökonomische Erfassung früher Traumatisierung: Erste psychometrische Charakterisierung der deutschen Version des Adverse Childhood Experiences Questionnaire (ACE). PPmP - Psychotherapie · Psychosomatik · Medizinische Psychologie, e10–e14. https://doi.org/10.1055/s-0030-1263161

Wittkowski, A., Williams, J., & Wieck, A. (2010). An examination of the psychometric properties and factor structure of the Post-partum Bonding Questionnaire in a clinical inpatient sample. British Journal of Clinical Psychology, 49(2), 163–172. https://doi.org/10.1348/014466509X445589

Wittkowski, A., Vatter, S., Muhinyi, A., Garrett, C., & Henderson, M. (2020). Measuring bonding or attachment in the parent-infant-relationship: A systematic review of parent-report assessment measures, their psychometric properties and clinical utility. Clinical Psychology Review, 82, 101906. https://doi.org/10.1016/j.cpr.2020.101906

Yildiz, P. D., Ayers, S., & Phillips, L. (2017). The prevalence of posttraumatic stress disorder in pregnancy and after birth: A systematic review and meta-analysis. Journal of Affective Disorders, 208, 634–645. https://doi.org/10.1016/j.jad.2016.10.009

Zerach, G., Shevlin, M., Cloitre, M., & Solomon, Z. (n.d.). Complex posttraumatic stress disorder (CPTSD) following captivity: A 24-year longitudinal study. European Journal of Psychotraumatology, 10(1), 1616488. https://doi.org/10.1080/20008198.2019.1616488

**Appendix**

A. Clinical Psychology Review Author Guidelines
B. PROSPERO Protocol
C. Data Extraction Form - QUADAS-2
D. Data Extraction Form – Screening
E. Data Extraction Form – Statistical
F. 2x2 Data
G. Journal of Affective Disorders Author Information Pack
H. NCMH Storyboard (including consent information and questionnaires)

**A. Clinical Psychology Review Author Guidelines**

# CLINICAL PSYCHOLOGY REVIEW

## AUTHOR INFORMATION PACK

### Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

### Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address

All necessary files have been uploaded:
*Manuscript*:
• Include keywords
• All figures (include relevant captions)
• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
• Indicate clearly if color should be used for any figures in print
*Graphical Abstracts / Highlights files* (where applicable)
*Supplemental files* (where applicable)

Critical Issues

- Ensure manuscript is a comprehensive review article (empirical papers fall outside the scope of the journal)
- Ensure that literature searches and reviews are as up to date as possible and at least to 3 months within date of submission
- Manuscript has been 'spell checked' and 'grammar checked'
- All references mentioned in the Reference List are cited in the text, and vice versa
- Permission has been obtained for use of copyrighted material from other sources (including the Internet)
- A competing interests statement is provided, even if the authors have no competing interests to declare
  • Journal policies detailed in this guide have been reviewed
- Referee suggestions and contact details provided, based on journal requirements
- Ensure manuscripts do not exceed 50 pages, including references and tabular material, unless you have obtained prior approval of the Editor in Chief for an exception
- Ensure Highlights do not exceed 3 to 5 bullet points with a maximum of 85 characters, including spaces, per bullet point

Failure to follow these guidelines may result in your manuscript being returned for reformatting prior to further consideration by the journal.

For further information, visit our Support Center.

## Before You Begin

### Ethics in publishing

Please see our information on Ethics in publishing.

### Declaration of interest

All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double anonymized) or the manuscript file (if single anonymized). If there are no interests to declare then please state this: 'Declarations of interest: none'. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. More information.

### Declaration of generative AI in scientific writing

The below guidance only refers to the writing process, and not to the use of AI tools to analyse and draw insights from data as part of the research process.

Where authors use generative artificial intelligence (AI) and AI-assisted technologies in the writing process, authors should only use these technologies to improve readability and language. Applying the technology should be done with human oversight and control, and authors should carefully review and edit the result, as AI can generate authoritative-sounding output that can be incorrect, incomplete or biased. AI and AI-assisted technologies should not be listed as an author or co-author, or be cited as an author. Authorship implies responsibilities and tasks that can only be attributed to and performed by humans, as outlined in Elsevier's AI policy for authors.

Authors should disclose in their manuscript the use of AI and AI-assisted technologies in the writing process by following the instructions below. A statement will appear in the published work. Please note that authors are ultimately responsible and accountable for the contents of the work.

***Disclosure instructions***
Authors must disclose the use of generative AI and AI-assisted technologies in the writing process by adding a statement at the end of their manuscript in the core manuscript file, before the References list. The statement should be placed in a new section entitled 'Declaration of Generative AI and AI-assisted technologies in the writing process'.

*Statement: During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.*

This declaration does not apply to the use of basic tools for checking grammar, spelling, references etc. If there is nothing to disclose, there is no need to add a statement.

**Submission declaration and verification**

Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify compliance, your article may be checked by Crossref Similarity Check and other originality or duplicate checking software.

***Preprints***
Please note that preprints can be shared anywhere at any time, in line with Elsevier's sharing policy. Sharing your preprints e.g. on a preprint server will not count as prior publication (see 'Multiple, redundant or concurrent publication' for more information).

***Language (usage and editing services)***
Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the English Language Editing service available from Elsevier's Author Services.

**Use of inclusive language**

Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Content should make no assumptions about the beliefs or commitments of any reader; contain nothing which might imply that one individual is superior to another on the grounds of age, gender, race, ethnicity, culture, sexual orientation, disability or health condition; and use inclusive language throughout. Authors should ensure that writing is free from bias, stereotypes, slang, reference to dominant culture and/or cultural assumptions. We advise to seek gender neutrality by using plural nouns ("clinicians, patients/clients") as default/wherever possible to avoid using "he, she," or "he/she." We recommend avoiding the use of descriptors that refer to personal attributes such as age, gender, race, ethnicity, culture, sexual orientation, disability or health condition unless they are relevant and valid. When coding terminology is used, we recommend to avoid offensive or exclusionary terms such as "master", "slave", "blacklist" and "whitelist". We suggest using alternatives that are more appropriate and (self-) explanatory such

as "primary", "secondary", "blocklist" and "allowlist". These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

## Reporting sex- and gender-based analyses

### *Reporting guidance*

For research involving or pertaining to humans, animals or eukaryotic cells, investigators should integrate sex and gender-based analyses (SGBA) into their research design according to funder/sponsor requirements and best practices within a field. Authors should address the sex and/or gender dimensions of their research in their article. In cases where they cannot, they should discuss this as a limitation to their research's generalizability. Importantly, authors should explicitly state what definitions of sex and/or gender they are applying to enhance the precision, rigor and reproducibility of their research and to avoid ambiguity or conflation of terms and the constructs to which they refer (see Definitions section below). Authors can refer to the Sex and Gender Equity in Research (SAGER) guidelines and the SAGER guidelines checklist. These offer systematic approaches to the use and editorial review of sex and gender information in study design, data analysis, outcome reporting and research interpretation - however, please note there is no single, universally agreed-upon set of guidelines for defining sex and gender.

### *Definitions*

Sex generally refers to a set of biological attributes that are associated with physical and physiological features (e.g., chromosomal genotype, hormonal levels, internal and external anatomy). A binary sex categorization (male/female) is usually designated at birth ("sex assigned at birth"), most often based solely on the visible external anatomy of a newborn. Gender generally refers to socially constructed roles, behaviors, and identities of women, men and gender-diverse people that occur in a historical and cultural context and may vary across societies and over time. Gender influences how people view themselves and each other, how they behave and interact and how power is distributed in society. Sex and gender are often incorrectly portrayed as binary (female/male or woman/man) and unchanging whereas these constructs actually exist along a spectrum and include additional sex categorizations and gender identities such as people who are intersex/have differences of sex development (DSD) or identify as non-binary. Moreover, the terms "sex" and "gender" can be ambiguous—thus it is important for authors to define the manner in which they are used. In addition to this definition guidance and the SAGER guidelines, the resources on this page offer further insight around sex and gender in research studies.

## Author contributions

For transparency, we require corresponding authors to provide co-author contributions to the manuscript using the relevant CRediT roles. The CRediT taxonomy includes 14 different roles describing each contributor’s specific contribution to the scholarly output. The roles are: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Roles/Writing - original draft; and Writing - review & editing. Note that not all roles

may apply to every manuscript, and authors may have contributed through multiple roles. More details and an example.

**Changes to authorship**

Authors are expected to consider carefully the list and order of authors **before** submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only **before** the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the **corresponding author**: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.
Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors **after** the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

***Article transfer service***
This journal uses the Elsevier Article Transfer Service to find the best home for your manuscript. This means that if an editor feels your manuscript is more suitable for an alternative journal, you might be asked to consider transferring the manuscript to such a journal. The recommendation might be provided by a Journal Editor, a dedicated Scientific Managing Editor, a tool assisted recommendation, or a combination. If you agree, your manuscript will be transferred, though you will have the opportunity to make changes to the manuscript before the submission is complete. Please note that your manuscript will be independently reviewed by the new journal. More information.

***Author Disclosure Policy***
Authors must provide three mandatory and one optional author disclosure statements. These statements should be submitted as one separate document and not included as part of the manuscript. Author disclosures will be automatically incorporated into the PDF builder of the online submission system. They will appear in the journal article if the manuscript is accepted.

The four statements of the author disclosure document are described below. Statements should not be numbered. Headings (i.e., Role of Funding Sources, Contributors, Conflict of Interest, Acknowledgements) should be in bold with no white space between the heading and the text. Font size should be the same as that used for references.

**Statement 1: Role of Funding Sources**
Authors must identify who provided financial support for the conduct of the research and/or preparation of the manuscript and to briefly describe the role (if any) of the funding sponsor in study design, collection, analysis, or interpretation of data, writing

the manuscript, and the decision to submit the manuscript for publication. If the funding source had no such involvement, the authors should so state.

Example: Funding for this study was provided by NIAAA Grant R01-AA123456. NIAAA had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

**Statement 2: Contributors**
Authors must declare their individual contributions to the manuscript. All authors must have materially participated in the research and/or the manuscript preparation. Roles for each author should be described. The disclosure must also clearly state and verify that all authors have approved the final manuscript.

Example: Authors A and B designed the study and wrote the protocol. Author C conducted literature searches and provided summaries of previous research studies. Author D conducted the statistical analysis. Author B wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

**Statement 3: Conflict of Interest**
All authors must disclose any actual or potential conflict of interest. Conflict of interest is defined as any financial or personal relationships with individuals or organizations, occurring within three (3) years of beginning the submitted work, which could inappropriately influence, or be perceived to have influenced the submitted research manuscript. Potential conflict of interest would include employment, consultancies, stock ownership (except personal investments equal to the lesser of one percent (1%) of total personal investments or USD$5000), honoraria, paid expert testimony, patent applications, registrations, and grants. If there are no conflicts of interest by any author, it should state that there are none.

Example: Author B is a paid consultant for XYZ pharmaceutical company. All other authors declare that they have no conflicts of interest.

**Statement 4: Acknowledgements (optional)**
Authors may provide Acknowledgments which will be published in a separate section along with the manuscript. If there are no Acknowledgements, there should be no heading or acknowledgement statement.

Example: The authors wish to thank Ms. A who assisted in the proof-reading of the manuscript.

**Copyright**

Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see more information on this). An e-mail will be sent to the corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. Permission of the Publisher is required for resale or distribution outside the institution and for all other derivative

works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases.

For gold open access articles: Upon acceptance of an article, authors will be asked to complete a 'License Agreement' (more information). Permitted third party reuse of gold open access articles is determined by the author's choice of user license.

***Author rights***
As an author you (or your employer or institution) have certain rights to reuse your work. More information.

***Elsevier supports responsible sharing***
Find out how you can share your research published in Elsevier journals.

**Role of the funding source**

You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement, it is recommended to state this.

**Open access**

Please visit our Open Access page for more information.

***Elsevier Researcher Academy***
Researcher Academy is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

**Submission**

Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

**Preparation**

**Queries**

For questions about the editorial process (including the status of manuscripts under review) or for technical support on submissions, please visit our Support Center.

**Peer review**

This journal operates a single anonymized review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. Editors are not involved in decisions about papers which they have written themselves or have been written by family members or colleagues or which relate to products or services in which the editor has an interest. Any such submission is subject to all of the journal's usual procedures, with peer review handled independently of the relevant editor and their research groups. More information on types of peer review.

***Use of word processing software***
It is important that the file be saved in the native format of the word processor used. The text should be in single-column format. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. In particular, do not use the word processor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. When preparing tables, if you are using a table grid, use only one grid for each individual table and not a grid for each row. If no grid is used, use tabs, not spaces, to align columns. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). Note that source files of figures, tables and text graphics will be required whether or not you embed your figures in the text. See also the section on Electronic artwork.
To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

**Article structure**

Manuscripts should be prepared according to the guidelines set forth in the most recent publication manual of the American Psychological Association. Of note, section headings should not be numbered.

Manuscripts should ordinarily not exceed 50 pages, *including* references and tabular material. Exceptions may be made with prior approval of the Editor in Chief. Manuscript length can often be managed through the judicious use of appendices. In general the References section should be limited to citations actually discussed in the text. References to articles solely included in meta-analyses should be included in an appendix, which will appear in the on line version of the paper but not in the print copy. Similarly, extensive Tables describing study characteristics, containing material published elsewhere, or presenting formulas and other technical material should also be included in an appendix. Authors can direct readers to the appendices in appropriate places in the text.

It is authors' responsibility to ensure their reviews are comprehensive and as up to date as possible (at least to 3 months within date of submission) so the data are still

current at the time of publication. Authors are referred to the PRISMA Guidelines (http://www.prisma-statement.org/) for guidance in conducting reviews and preparing manuscripts. Adherence to the Guidelines is not required, but is recommended to enhance quality of submissions and impact of published papers on the field.

***Appendices***
If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

**Essential title page information**

*Title.* Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible. **Note: The title page should be the first page of the manuscript document indicating the author's names and affiliations and the corresponding author's complete contact information.**

*Author names and affiliations.* Where the family name may be ambiguous (e.g., a double name), please indicate this clearly. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name, and, if available, the e-mail address of each author within the cover letter.

*Corresponding author.* Clearly indicate who is willing to handle correspondence at all stages of refereeing and publication, also post-publication. **Ensure that telephone and fax numbers (with country and area code) are provided in addition to the e-mail address and the complete postal address.**

*Present/permanent address.* If an author has moved since the work described in the article was done, or was visiting at the time, a "Present address"' (or "Permanent address") may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

**Highlights**

Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the example Highlights.

Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

### *Abstract*
A concise and factual abstract is required (not exceeding 200 words). This should be typed on a separate page following the title page. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separate from the article, so it must be able to stand alone. References should therefore be avoided, but if essential, they must be cited in full, without reference to the reference list.

### *Graphical abstract*
Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site.

### Keywords

Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

### *Abbreviations*
Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

### *Acknowledgements*
Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

### *Formatting of funding sources*
List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a

university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, it is recommended to include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

***Footnotes***
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

***Electronic artwork***
*General points*
• Make sure you use uniform lettering and sizing of your original artwork.
• Embed the used fonts if the application provides that option.
• Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
• Number the illustrations according to their sequence in the text.
• Use a logical naming convention for your artwork files.
• Provide captions to illustrations separately.
• Size the illustrations close to the desired dimensions of the published version.
• Submit each illustration as a separate file.
• Ensure that color images are accessible to all, including those with impaired color vision.

A detailed guide on electronic artwork is available.
**You are urged to visit this site; some excerpts from the detailed information are given here.**
*Formats*
If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.
Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):
EPS (or PDF): Vector drawings, embed all used fonts.
TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.
TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.
**Please do not:**
• Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;

• Supply files that are too low in resolution;
• Submit graphics that are disproportionately large for the content.

***Color artwork***
Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. **For color reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article**. Please indicate your preference for color: in print or online only. Further information on the preparation of electronic artwork.

***Figure captions***
Ensure that each illustration has a caption. Supply captions separately, not attached to the figure. A caption should comprise a brief title (**not** on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

**Tables**

Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

***References***
Citations in the text should follow the referencing style used by the American Psychological Association. You are referred to the most recent publication manual of the American Psychological Association. Information can be found at https://apastyle.apa.org/

***Citation in text***
Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

***Web references***
As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be

listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

***Data references***
This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

***Preprint references***
Where a preprint has subsequently become available as a peer-reviewed publication, the formal publication should be used as the reference. If there are preprints that are central to your work or that cover crucial developments in the topic, but are not yet formally published, these may be referenced. Preprints should be clearly marked as such, for example by including the word preprint, or the name of the preprint server, as part of the reference. The preprint DOI should also be provided.

***References in a special issue***
Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

***Reference management software***
Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley. Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. More information on how to remove field codes from different reference management software.

**Reference style**

References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication. **References should be formatted with a hanging indent (i.e., the first line of each reference is flush left while the subsequent lines are indented).**

*Examples:* Reference to a journal publication: Van der Geer, J., Hanraads, J. A. J., & Lupton R. A. (2000). The art of writing a scientific article. *Journal of Scientific Communications,* 163, 51-59.

Reference to a book: Strunk, W., Jr., &White, E. B. (1979). *The elements of style.* (3rd ed.). New York: Macmillan, (Chapter 4).

Reference to a chapter in an edited book: Mettam, G. R., & Adams, L. B. (1994). How to prepare an electronic version of your article. In B.S. Jones, & R. Z. Smith (Eds.), *Introduction to the electronic age* (pp. 281-304). New York: E-Publishing Inc.

[dataset] Oguro, M., Imahiro, S., Saito, S., Nakashizuka, T. (2015). *Mortality data for Japanese oak wilt disease and surrounding forest compositions.* Mendeley Data, v1. http://dx.doi.org/10.17632/xwj98nb39r.1

**Video**

Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

**Supplementary material**

Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

**Research data**

This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings, which may also include software,

code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.

***Data linking***
If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

***Data statement***
To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

## After Acceptance

### Online proof correction

To ensure a fast publication process of the article, we kindly ask authors to provide us with their proof corrections within two days. Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors.
If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors,

including alternative methods to the online version and PDF.
We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

**Offprints**

The corresponding author will, at no cost, receive a customized Share Link providing 50 days free access to the final published version of the article on ScienceDirect. The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

## B. PROSPERO Protocol

**PROSPERO**
**International prospective register of systematic reviews**

NHS National Institute for Health Research

UNIVERSITY of York
Centre for Reviews and Dissemination

# Systematic review

A list of fields that can be edited in an update can be found here

### 1. * Review title.

Give the title of the review in English

The diagnostic accuracy of the PTSD Checklist for DSM-5 (PCL-5): a systematic review

### 2. Original language title.

For reviews in languages other than English, give the title in the original language. This will be displayed with the English language title.

### 3. * Anticipated or actual start date.

Give the date the systematic review started or is expected to start.

05/08/2022

### 4. * Anticipated completion date.

Give the date by which the review is expected to be completed.

16/12/2022

### 5. * Stage of review at time of this submission.

**This field uses answers to initial screening questions. It cannot be edited until after registration.**

Tick the boxes to show which review tasks have been started and which have been completed.

Update this field each time any amendments are made to a published record.

The review has not yet started: Yes

| Review stage | Started | Completed |
|---|---|---|
| Preliminary searches | No | No |
| Piloting of the study selection process | No | No |
| Formal screening of search results against eligibility criteria | No | No |
| Data extraction | No | No |
| Risk of bias (quality) assessment | No | No |
| Data analysis | No | No |

Provide any other relevant information about the stage of the review here.

## 6. * Named contact.

The named contact is the guarantor for the accuracy of the information in the register record. This may be any member of the review team.

Adam Cann

## Email salutation (e.g. "Dr Smith" or "Joanne") for correspondence:

Adam

## 7. * Named contact email.

Give the electronic email address of the named contact.

cannaj@cardiff.ac.uk

## 8. Named contact address

Give the full institutional/organisational postal address for the named contact.

South Wales Doctoral Programme in Clinical Psychology

School of Psychology

Cardiff University

Tower Building

70 Park Place

CARDIFF

CF10 3AT

## 9. Named contact phone number.

Give the telephone number for the named contact, including international dialling code.

+44 (0)7545090589

## 10. * Organisational affiliation of the review.

Full title of the organisational affiliations for this review and website address if available. This field may be completed as 'None' if the review is not affiliated to any organisation.

Cardiff University; Cardiff & Vale University Health Board

## Organisation web address:

https://www.cardiff.ac.uk; https://cavuhb.nhs.wales/

## 11. * Review team members and their organisational affiliations.

Give the personal details and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong. **NOTE: email and country now MUST be entered for each person, unless you are amending a published record.**

Mr Adam Cann. Cardiff University / Cardiff & Vale University Health Board
Dr Cerith Waters. Cardiff University / Cardiff & Vale University Health Board
Dr Neil Roberts. Cardiff University / Cardiff & Vale University Health Board

## 12. * Funding sources/sponsors.

Details of the individuals, organizations, groups, companies or other legal entities who have funded or sponsored the review.

None. This study is being undertaken as partial fulfilment of a doctoral qualification

## Grant number(s)

State the funder, grant or award number and the date of award

## 13. * Conflicts of interest.

List actual or perceived conflicts of interest (financial or academic).

Yes

Dr Neil Roberts is the lead author of one study evaluating the PCL-5 which may be eligible for inclusion in this review.

## 14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members. **NOTE: email and country must be completed for each person, unless you are amending a published record.**

## 15. * Review question.

State the review question(s) clearly and precisely. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS or similar where relevant.

What is the quality of diagnostic accuracy studies of the Post-Traumatic Stress Disorder Checklist for DSM-5 (PCL-5; Weathers et al., 2013)?

This systematic review will examine the diagnostic accuracy of the PCL-5 in relation to estimates of Sensitivity and Specificity based on two thresholds commonly used in research (?33) and clinical practice (?32). We will develop summary receiver operating characteristic (SROC) plots for graphical representation using RevMan if sufficient data permits for these data points.

The Quality Assessment of Diagnostic Accuracy Studies tool (QUADAS-2; Whiting et al., 2011) will be used to evaluate the quality of diagnostic accuracy studies of the PCL-5. Studies will also be assessed on quality of reporting using the STAndards for the Reporting of Diagnostic accuracy studies (STARD; Bossuyt et al., 2015).

## 16. * Searches.

State the sources that will be searched (e.g. Medline). Give the search dates, and any restrictions (e.g. language or publication date). Do NOT enter the full search strategy (it may be provided as a link or attachment below.)

This review will be the first systematic review of diagnostic accuracy studies of the PCL-5.

Database searches will be conducted from the publication date of the PCL-5: 2013 to present day. Searches will be limited to English language studies.

The following databases will be searched: Embase, MEDLINE, PubMed, PsycINFO and PTSDPubs, and Web of Science.

The reference lists from articles identified will also be examined for further studies to include.

Search terms will include: "Post-Traumatic Stress Disorder"; "PTSD"; "PTSD Checklist for DSM-5"; "Post-Traumatic Stress Disorder Checklist for DSM-5"; "Posttraumatic Stress Disorder Checklist DSM-5"; "Post-Traumatic Stress Checklist for DSM-5"; "PCL-5"; "PCL5".

These terms will be combined in separate searches with "diagnostic accuracy" "diagnostic efficiency", "sensitivity" and "specificity".

## 17. URL to search strategy.

Upload a file with your search strategy, or an example of a search strategy for a specific database, (including the keywords) in pdf or word format. In doing so you are consenting to the file being made publicly accessible. Or provide a URL or link to the strategy. Do NOT provide links to your search **results**.

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Do not make this file publicly available until the review is complete

## 18. * Condition or domain being studied.

Give a short description of the disease, condition or healthcare domain being studied in your systematic review.

Post-Traumatic Stress Disorder (PTSD) is a common mental health difficulty experienced by individuals who have experienced or been indirectly exposed to a traumatic event.

Symptoms include reliving traumatic memories in intrusive thoughts or flashbacks, nightmares, hypervigilance, emotional reactivity, negative affect and negative beliefs about the self. As a consequence avoidance of memorable situations or objects that trigger memories of the trauma is a common. PTSD is a debilitating mental health problem that can lead to marked functional impairment.

The accurate identification of PTSD in research samples and in clinical practice has implications for the development and efficacy of treatment strategies. Furthermore, screening questionnaires are often used to identify probable caseness in research studies and to inform clinical decision making.

DSM-5, diagnostic criteria for PTSD differs from DSM-IV criteria for which the original Post-Traumatic Checklist (PCL) was developed. Additional symptoms of exaggerated blame, negative emotions, and reckless or self-destructive behaviour were added in DSM-5 criteria and some items were revised.

## 19. * Participants/population.

Specify the participants or populations being studied in the review. The preferred format includes details of both inclusion and exclusion criteria.

Participants included in studies of the diagnostic accuracy of the PCL-5 are likely to be help-seeking clinical populations, student populations and veterans. For inclusion studies must assess participants on an established index measure of PTSD, such as a structured diagnostic interview.

## 20. * Intervention(s), exposure(s).

Give full and clear descriptions or definitions of the interventions or the exposures to be reviewed. The preferred format includes details of both inclusion and exclusion criteria.

Not applicable (this review is looking at the diagnostic accuracy of the PTSD Checklist for DSM-5 (PCL-5)).

## 21. * Comparator(s)/control.

Where relevant, give details of the alternatives against which the intervention/exposure will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.

Not relevant.

## 22. * Types of study to be included.

Give details of the study designs (e.g. RCT) that are eligible for inclusion in the review. The preferred format includes both inclusion and exclusion criteria. If there are no restrictions on the types of study, this should be stated.

Studies of diagnostic accuracy of the PTSD Checklist for DSM-5 (PCL-5) in comparison to a validated clinician administered semi-structured diagnostic instrument or an alternative validated self-report measure.

Studies that involve the evaluation of the PCL-5 but are not directly addressing its diagnostic accuracy will be excluded.

## 23. Context.

Give summary details of the setting or other relevant characteristics, which help define the inclusion or exclusion criteria.

## 24. Main outcome(s).

Give the pre-specified main (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.

Sensitivity and specificity will be calculated using TP, FN, TN and FP values reported in each study. We will specify two cut off points commonly used in research and clinical practice: ?32 and ?33. A cut-off score for caseness between 31-33 is recommended by National Center for PTSD (https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp). We will develop summary receiver operating characteristic (SROC) plots for graphical representation using RevMan if sufficient data permits for these data points.

Furthermore we will report the quality of studies included using QUADAS-2 (Whiting et al., 2011) and adherence to STARD reporting standards (Bossuyt et al., 2015).

The QUADAS-2 is the World Health Organisation recommended tool for the assessment of diagnostic accuracy studies (WHO, 2014). The tool is designed to assess the risk of bias in diagnostic accuracy studies across four domains: participant selection, index test, reference standard, flow and timing. The STARD checklist provides a reporting standard for diagnostic accuracy studies to minimise risk of bias, and improve generalisability and applicability of results. The checklist, and accompanying report (Cohen et al., 2016), provides guidance and examples of quality reporting for individual sections of a published report.

## Measures of effect

Please specify the effect measure(s) for you main outcome(s) e.g. relative risks, odds ratios, risk difference, and/or 'number needed to treat.

Sensitivity and specificity percentages will be calculated using TP, FN, TN and FP values.

## 25. Additional outcome(s).

List the pre-specified additional outcomes of the review, with a similar level of detail to that required for main outcomes. Where there are no additional outcomes please state 'None' or 'Not applicable' as appropriate to the review

None.

## Measures of effect

Please specify the effect measure(s) for you additional outcome(s) e.g. relative risks, odds ratios, risk difference, and/or 'number needed to treat.

## 16. Data extraction (selection and coding).

Describe how studies will be selected for inclusion. State what data will be extracted or obtained. State how this will be done and recorded.

Inclusion/ exclusion, data extraction and quality ratings will be independently corroborated. Where discrepancies occur, establishing consensus will be attempted by discussion. Where there is still disagreement, a third researcher will be consulted to arbitrate. Inter-rater reliability statistics will be reported.

Data from psychometric evaluations will be extracted including area under the curve, identified cut-off scores with sensitivity and specificity percentages (calculated using TP, FN, TN and FP values), reliability and validity data. Quality ratings will be carried out using QUADAS-2 and STARD criteria.

Guidance for the QUADAS-2 emphasises the identification of additional quality assessment criteria relevant to the literature. The following criteria will be included into the analysis in line with McDonald et al.'s (2015) review of the PTSD Checklist: details of recruitment and sampling (e.g. veteran, demographics), nature of index trauma (e.g. traffic accident, developmental childhood trauma), severity of PTSD and comorbidity. Further criteria will include the suggested clinical 'cut-off' score and a description of how this was decided. The time between administration of the reference standard and the PCL-5 will also be included (a maximum of 30 days).

Further criteria have been added to this review that are relevant to the PCL-5. To address possible biases in clinician administered semi-structured interviews, this review will adopt a quality criterion of internal consistency: whether Cronbach's alpha is higher than 0.70 (Nunnally & Bernstein, 1994). Inter-rater reliability statistics will also be considered with a standard of Cohen's kappa or Intraclass correlation coefficient higher than 0.60 (Landis & Koch, 1977). The type of index assessment will be assessed (clinician administered or self-report). Whether the criterion requiring functional impairment or clinically significant distress was included in the diagnosis of PTSD will be assessed.

## 27. * Risk of bias (quality) assessment.

State which characteristics of the studies will be assessed and/or any formal risk of bias/quality assessment tools that will be used.

Risk of bias within study reporting will be assessed using the QUADAS-2 tool. The tool assesses risk of bias by specifying: method of participant selection, presence of random sampling, avoidance of case-control design, use of appropriate exclusions, appropriateness of population for the review's intended outcomes.

## 28. * Strategy for data synthesis.

Describe the methods you plan to use to synthesise data. This **must not be generic text** but should be **specific to your review** and describe how the proposed approach will be applied to your data. If meta-analysis is planned, describe the models to be used, methods to explore statistical heterogeneity, and software package to be used.

Sensitivity and specificity will be calculated using TP, FN, TN and FP values reported in each study using RevMan 2x2 Accuracy Calculator. Whilst we anticipate that the positivity threshold will vary across studies we will specify two cut off points commonly used in research and clinical practice: ?32 and ?33. A cut-off score for caseness between 31-33 is recommended by National Center for PTSD (https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp). A cut-off value of ?32 is widely used in clinical practice in the UK - as recommended in the IAPT Manual (NCCMH, 2021). A cut-off value of ?33 is commonly used in research (e.g. Akhtar et al., 2022; Lu et al., 2022). We will develop summary receiver operating characteristic (SROC) plots for graphical representation using RevMan if sufficient data permits for these data points.

The quality of studies included will be reported in a table ensuring transparency and replicability. A written analysis and evaluation of the literature will be provided with implications and recommendations for future research.

## 29. * Analysis of subgroups or subsets.

State any planned investigation of 'subgroups'. Be clear and specific about which type of study or participant will be included in each group or covariate investigated. State the planned analytic approach.

None planned (subgroup analysis is not necessary for this study).

## 30. * Type and method of review.

Select the type of review, review method and health area from the lists below.

### Type of review

Cost effectiveness

No

Diagnostic

Yes

Epidemiologic

No

Individual patient data (IPD) meta-analysis

No

Intervention

No

Living systematic review

No

Meta-analysis

No

Methodology

No

Narrative synthesis

No

Network meta-analysis

No

Pre-clinical

No

Prevention

No

Prognostic

No

Prospective meta-analysis (PMA)

No

Review of reviews

No

Service delivery

No

Synthesis of qualitative studies

No

Systematic review

Yes

Other

No

## Health area of the review

Alcohol/substance misuse/abuse

No

Blood and immune system

No

Cancer

No

Cardiovascular

No

Care of the elderly

No

Child health

No

Complementary therapies

No

COVID-19

No

Crime and justice

No

Dental

No

Digestive system

No

Ear, nose and throat

No

Education

No

Endocrine and metabolic disorders

No

Eye disorders

No

General interest

No

Genetics

No

Health inequalities/health equity
No

Infections and infestations
No

International development
No

Mental health and behavioural conditions
Yes

Musculoskeletal
No

Neurological
No

Nursing
No

Obstetrics and gynaecology
No

Oral health
No

Palliative care
No

Perioperative care
No

Physiotherapy
No

Pregnancy and childbirth
No

Public health (including social determinants of health)
No

Rehabilitation
No

Respiratory disorders
No

Service delivery
No

Skin disorders

No

Social care

No

Surgery

No

Tropical Medicine

No

Urological

No

Wounds, injuries and accidents

No

Violence and abuse

No

## 31. Language.

Select each language individually to add it to the list below, use the bin icon to remove any added in error.

English

There is not an English language summary

## 32. * Country.

Select the country in which the review is being carried out. For multi-national collaborations select all the countries involved.

Wales

## 33. Other registration details.

Name any other organisation where the systematic review title or protocol is registered (e.g. Campbell, or The Joanna Briggs Institute) together with any unique identification number assigned by them. If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

## 34. Reference and/or URL for published protocol.

If the protocol for this review is published provide details (authors, title and journal details, preferably in Vancouver format)

Add web link to the published protocol.

Or, upload your published protocol here in pdf format. Note that the upload will be publicly accessible.

No I do not make this file publicly available until the review is complete

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

## 35. Dissemination plans.

Do you intend to publish the review on completion?

Yes

Give brief details of plans for communicating review findings.?

The reviewers intend to publish the results in of the systematic review in a peer-reviewed journal and present findings at a relevant conference.

## 36. Keywords.

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords help PROSPERO users find your review (keywords do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

Post-Traumatic Stress Disorder; PTSD; PTSD Checklist for DSM-5; PCL-5

## 37. Details of any existing review of the same topic by the same authors.

If you are registering an update of an existing review give details of the earlier versions and include a full bibliographic reference, if available.

## 38. * Current review status.

Update review status when the review is completed and when it is published.New registrations must be ongoing so this field is not editable for initial submission.

Please provide anticipated publication date

Review_Ongoing

## 39. Any additional information.

Provide any other information relevant to the registration of this review.

## 40. Details of final report/publication(s) or preprints if available.

Leave empty until publication details are available OR you have a link to a preprint (NOTE: this field is not editable for initial submission). List authors, title and journal details preferably in Vancouver format.

Give the link to the published review or preprint.

## C. Data Extraction Form - QUADAS-2

### Data Extraction Form

| | |
|---|---|
| **Researcher:** | |
| **Date:** | |

| Paper Authors | Lead Author | Year | DOI | Journal |
|---|---|---|---|---|
| | | | | |

Please copy and paste data from paper directly.

### Study Characteristics

| Item | Data |
|---|---|
| Country | |
| Recruitment method(s) | |
| Population type(s)<br>(E.g. Clinical/ Veteran/ Student/ Adult/ Non- Clinical/ Other - Specify) | |
| Exclusion criteria | |
| Mean Participant Age / Standard Deviation | |
| Nature of Reported Index Trauma(s)<br><br>(Please broadly describe the types of traumas experienced by participants and proportion of types) | |
| Reference Test(s)<br>E.g. CAPS-5 | |
| Index Test(s)<br>I.e. PCL-5 and any others | |
| Translation procedure<br><br>(How was the translation of the measures handled? Existing translation? Self-translated? N/A = English PCL-5 studies) | |
| Time (or average time) between index and reference test administration | |
| Number of participants contributing to diagnostic accuracy study (all included in analysis) | |
| Number of PTSD diagnoses within the study (N= / %) | |

| | |
|---|---|
| Final recommended cut- off score | |

### Diagnostic Accuracy Items

| | Cut- off Score | | |
|---|---|---|---|
| Items<br>(May need to consult supplementary material) | **31** | **32** | **33** |
| Sensitivity | | | |
| Specificity | | | |
| Positive predictive value (PPV) | | | |
| Negative predictive value (NPV) | | | |
| Diagnostic accuracy<br>(Perfect accuracy = 1) | | | |
| Range of reported cut-off scores<br><br>(Full range of reported cut-off scores reported in the ROC analysis table) | | | |
| Area under curve (AUC) | | | |
| Reliability (Cronbach's Alpha)<br><br>(i.e. internal reliability of PCL-5, how closely items reflect each other) | | | |
| Validity data<br><br>Narrative description of concurrent and discriminant validity (i.e. studies may predict correlations with other measures that related) | | | |
| Test- retest reliability<br>(reliability coefficient)<br><br>(of PCL-5) | | | |

### QUADAS 2 Items

| **Study Details** | |
|---|---|
| Patients (setting, intended use of index test, presentation, prior testing):<br><br>'How study participants were identified, contacted and included into the study, and whether this could have introduced bias. Applicability refers to the match, or the lack thereof, between study participants and the target population, as defined in the review question' | |
| Index test(s): | |
| Reference standard(s) for PTSD: | |

| | |
|---|---|
| Number of total potential participants (before any exclusion decisions): | |
| Number assessed: | |
| Number included into study (i.e. included in analysis): | |
| **1. (a). Participant Selection - Risk of Bias** | |
| Please describe methods of participant selection<br><br>This includes how participants were identified, contacted, and including in the study<br><br>Consider to what extent the study participants match the target population being studied<br>(e.g. primary care screening, treatment seeking, veteran) | |
| Was a consecutive or random sample of patients enrolled? | |
| Was a case-control design avoided? | |
| Did the study avoid inappropriate exclusions? | |
| Are the nature of index traumas reported? Please give details? | Yes/No/Unclear |
| If the participants experienced a number of similar traumatic events this is likely to bias results (e.g. only military trauma.<br><br>Was this avoided?<br><br>(Reword the question, so yes is good thing) | Yes/No/Unclear |
| Could the selection of patients have introduced bias? | RISK:<br>LOW/HIGH/UNCLEAR |
| **1. (b). Participant Selection - Concerns regarding applicability** | |

| | |
|---|---|
| Describe included patients<br><br>This includes prior testing, presentation, intended use of index test and setting, PTSD severity, comorbidity | |
| Is there concern that the included patients do not match the review question? | Yes/No/Unclear |
| **2. (a). Index Tests - Risk of Bias** | |
| Describe the index test and how it was conducted and interpreted | |
| Were the index test results interpreted without knowledge of the results of the reference standard? | Yes/No/Unclear |
| If a threshold (cut-off) was used, was it pre-specified? | Yes/No/Unclear |
| If a threshold (cut-off) was used, was there a description about how this was arrived at? | Yes/No/Unclear |
| Was an internal consistency statistic reported (i.e. Cronbach's Alpha)? And was it higher than 0.70? | Yes/No/Unclear<br><br>Reported statistic: |
| Could the conduct or interpretation of the index test have introduced bias? | RISK: LOW /HIGH/UNCLEAR |
| **2. (b). Index Test(s) - Concerns regarding applicability** | |
| Is there concern that the index test, its conduct, or interpretation differ from the review question? | CONCERN: LOW /HIGH/UNCLEAR |
| **3. (a). Reference Standard - Risk of Bias** | |
| Describe the reference standard and how it was conducted and interpreted:<br><br>(Including self-report or clinician administered, clinician administered is considered optimal; and whether functional impairment and clinically significant distress was included in diagnosis. Some studies might interpret the CAP-5 based on only symptom scores - liberal and stringent interpretations in studies) | |
| Is the reference standard likely to correctly classify the target condition? | Yes/No/Unclear |
| Were the reference standard results interpreted without knowledge of the results of the index test? | Yes/No/Unclear |
| **Were inter-rater reliability statistics reported? (e.g. Cohen's kappa or Intraclass correlation coefficient higher than 0.60) | Yes/No/Unclear |
| **If inter-rater reliability statistics were reported, what were they? | Not reported |
| Could the reference standard, its conduct, or its interpretation have introduced bias? | RISK: LOW /HIGH/UNCLEAR |

| 3. (b). Reference Standard - Concerns regarding applicability | |
|---|---|
| Is there concern that the target condition as defined by the reference standard does not match the review question? | CONCERN: LOW /HIGH/UNCLEAR |
| **4. (a). Flow and Timing - Risk of Bias** | |
| Describe any patients who did not receive the index test(s) and/or reference standard or who were excluded from the 2x2 table | |
| Describe the time interval and any interventions between index test(s) and reference standard:<br><br>(Do not report averages, what were the study rules)<br><br>(If over 30 days, should be excluded at screening stage) | |
| Was there an appropriate interval between index test(s) and reference standard? | Yes/No/Unclear |
| Did all patients receive a reference standard? | Yes/No/Unclear |
| Did patients receive the same reference standard? | Yes/No/Unclear |
| Were all patients included in the analysis? | Yes/No/Unclear |
| Could the patient flow have introduced bias? | RISK: LOW /HIGH/UNCLEAR |

### Discussion & Corroboration

| Item Discussed (E.g… ) | Researchers Involved | Discussion, Decision and Rationale | | Resolved? |
|---|---|---|---|---|
| | | | | |
| | | | | |

## D. Data Extraction Form – Screening

| Study | English language study (Y/N) | Diagnostic accuracy study examining PCL-5 vs. a validated reference test (Y/N) | Reference test(s) used | Diagnostic accuracy study examining PCL-5 vs. a validated self-report measure (Y/N) | Self-report measure(s) used | Population studied - E.g. Clinical/ Veteran/ Student/ Adult/ Other (Specify) | Time between index and reference test administration (1> / <1 month) | Include/ Exlude/ Unclear | Notes | Data Extraction Issues | Researchers in discussion (if applicable) | Final decision (Include / Exclude) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |

## E. Data Extraction Form – Statistical

| Study | Threshold Cut-off value | TP | FP | TN | FN | Sensitivity | Specificity | PPV | NPV | AUC | Diagnostic Accuracy Diagnostic Efficiency | Prevalence Established by reference standard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

## F. 2x2 Data

| Paper | Cutoff | TP | FP | TN | FN |
|---|---|---|---|---|---|
| Bovin2016 | 31 | 56 | 13 | 28 | 8 |
| Bovin2016 | 32 | 56 | 13 | 28 | 8 |
| Bovin2016 | 33 | 56 | 13 | 28 | 8 |
| Bovin2016 | 34 | 56 | 13 | 28 | 8 |
| Bovin2016 | 35 | 54 | 13 | 28 | 10 |
| Bovin2016 | 36 | 54 | 13 | 28 | 10 |
| Bovin2016 | 38 | 50 | 10 | 31 | 14 |
| Bovin2016 | 29 | 57 | 15 | 25 | 7 |
| Bovin2016 | 30 | 57 | 15 | 25 | 7 |
| Bovin2016 | 37 | 52 | 12 | 29 | 12 |
| Bovin2016 | 39 | 49 | 10 | 31 | 15 |
| Bovin2016 | 40 | 48 | 10 | 31 | 16 |
| Bovin2016 | 28 | 59 | 18 | 22 | 5 |
| Bovin2016 | 41 | 45 | 9 | 32 | 19 |
| Bovin2016 | 43 | 41 | 7 | 34 | 22 |
| Bovin2016 | 44 | 39 | 7 | 34 | 24 |
| Bovin2016 | 42 | 41 | 9 | 32 | 22 |
| Bovin2016 | 45 | 38 | 7 | 34 | 25 |
| Bovin2016 | 46 | 37 | 7 | 34 | 26 |
| Bovin2016 | 47 | 35 | 7 | 34 | 28 |
| Bovin2016 | 48 | 33 | 7 | 34 | 30 |
| Boyd2022 | 20.5 | 178 | 315 | 134 | 3 |
| Boyd2022 | 21.5 | 177 | 306 | 142 | 4 |
| Boyd2022 | 22.5 | 177 | 298 | 150 | 4 |
| Boyd2022 | 23.5 | 177 | 291 | 158 | 4 |
| Boyd2022 | 24.5 | 176 | 280 | 168 | 5 |
| Boyd2022 | 25.5 | 176 | 276 | 173 | 5 |
| Boyd2022 | 26.5 | 175 | 269 | 179 | 6 |
| Boyd2022 | 27.5 | 175 | 264 | 185 | 6 |
| Boyd2022 | 28.5 | 174 | 256 | 192 | 6 |
| Boyd2022 | 29.5 | 173 | 248 | 200 | 7 |
| Boyd2022 | 30.5 | 172 | 241 | 207 | 8 |
| Boyd2022 | 31.5 | 172 | 235 | 213 | 8 |
| Boyd2022 | 32.5 | 169 | 228 | 221 | 11 |
| Boyd2022 | 33.5 | 168 | 222 | 227 | 12 |
| Boyd2022 | 34.5 | 167 | 216 | 233 | 13 |
| Boyd2022 | 35.5 | 167 | 205 | 243 | 13 |
| Boyd2022 | 36.5 | 165 | 199 | 249 | 16 |
| Boyd2022 | 37.5 | 162 | 189 | 260 | 19 |
| Boyd2022 | 38.5 | 160 | 183 | 265 | 21 |
| Boyd2022 | 39.5 | 160 | 175 | 274 | 21 |
| Boyd2022 | 40.5 | 155 | 165 | 284 | 25 |

| | | | | | |
|---|---|---|---|---|---|
| Boyd2022 | 41.5 | 153 | 161 | 288 | 28 |
| Boyd2022 | 42.5 | 151 | 155 | 293 | 30 |
| Boyd2022 | 43.5 | 149 | 146 | 303 | 32 |
| Boyd2022 | 44.5 | 148 | 138 | 310 | 33 |
| Boyd2022 | 45.5 | 146 | 135 | 314 | 35 |
| Boyd2022 | 46.5 | 140 | 127 | 322 | 40 |
| Boyd2022 | 47.5 | 138 | 119 | 330 | 43 |
| Boysan2017 | 41.5 | 27 | 14 | 46 | 3 |
| Boysan2017 | 44 | 27 | 13 | 47 | 3 |
| Boysan2017 | 46.5 | 27 | 12 | 48 | 3 |
| Boysan2017 | 47.5 | 25 | 12 | 48 | 5 |
| Hall2019 | 22 | 18 | 22 | 38 | 1 |
| Hall2019 | 23 | 18 | 20 | 40 | 1 |
| Hall2019 | 24 | 18 | 20 | 40 | 1 |
| Hall2019 | 25 | 17 | 16 | 44 | 2 |
| Hall2019 | 26 | 14 | 14 | 46 | 5 |
| Hall2019 | 27 | 13 | 13 | 47 | 6 |
| Hall2019 | 28 | 12 | 13 | 47 | 7 |
| Hansen2023 | 26 | 44 | 15 | 18 | 7 |
| Hansen2023 | 27 | 43 | 15 | 18 | 8 |
| Hansen2023 | 28 | 43 | 14 | 19 | 8 |
| Hansen2023 | 29 | 43 | 14 | 19 | 8 |
| Hansen2023 | 30 | 41 | 14 | 19 | 10 |
| Hansen2023 | 31 | 40 | 13 | 20 | 11 |
| Hansen2023 | 32 | 39 | 13 | 20 | 12 |
| Hansen2023 | 33 | 39 | 13 | 20 | 12 |
| Hansen2023 | 34 | 39 | 11 | 22 | 12 |
| Hansen2023 | 35 | 38 | 10 | 23 | 13 |
| Hansen2023 | 36 | 35 | 8 | 25 | 16 |
| Hansen2023 | 37 | 34 | 8 | 25 | 17 |
| Hansen2023 | 38 | 33 | 8 | 25 | 18 |
| Jiang2023 | 31.5 | 14 | 18 | 316 | 0 |
| Jiang2023 | 32.5 | 14 | 15 | 319 | 0 |
| Jiang2023 | 33.5 | 14 | 10 | 324 | 0 |
| Jiang2023 | 34.5 | 14 | 9 | 325 | 0 |
| Jiang2023 | 35.5 | 14 | 8 | 326 | 0 |
| Jiang2023 | 37 | 14 | 7 | 327 | 0 |
| Jiang2023 | 38.5 | 13 | 6 | 328 | 1 |
| Jiang2023 | 40.5 | 13 | 5 | 329 | 1 |
| Jiang2023 | 42.5 | 13 | 4 | 330 | 1 |
| Jiang2023 | 43.5 | 12 | 3 | 331 | 2 |
| Jiang2023 | 44.5 | 10 | 3 | 331 | 4 |
| Jiang2023 | 45.5 | 10 | 2 | 332 | 4 |
| Kagee2022 | 20.5 | 95 | 117 | 469 | 6 |
| Kagee2022 | 21.5 | 95 | 114 | 472 | 6 |
| Kagee2022 | 22.5 | 95 | 109 | 478 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Kagee2022 | 23.5 | 95 | 104 | 482 | 6 |
| Kagee2022 | 24.5 | 94 | 100 | 487 | 7 |
| Kagee2022 | 25.5 | 94 | 96 | 490 | 7 |
| Kagee2022 | 26.5 | 94 | 89 | 498 | 7 |
| Kagee2022 | 27.5 | 94 | 86 | 500 | 7 |
| Kagee2022 | 28.5 | 93 | 82 | 505 | 8 |
| Kagee2022 | 29.5 | 91 | 77 | 509 | 10 |
| Kagee2022 | 30.5 | 89 | 75 | 512 | 12 |
| Kagee2022 | 31.5 | 89 | 69 | 517 | 12 |
| Kagee2022 | 32.5 | 87 | 65 | 521 | 14 |
| Kagee2022 | 33.5 | 87 | 65 | 522 | 14 |
| Kagee2022 | 34.5 | 87 | 61 | 526 | 14 |
| Kagee2022 | 35.5 | 87 | 59 | 527 | 14 |
| Kagee2022 | 36.5 | 85 | 57 | 529 | 16 |
| Kagee2022 | 37.5 | 83 | 52 | 534 | 18 |
| Kagee2022 | 38.5 | 83 | 51 | 536 | 18 |
| Kagee2022 | 39.5 | 81 | 48 | 538 | 20 |
| Kagee2022 | 40.5 | 78 | 48 | 538 | 23 |
| Kagee2022 | 41.5 | 76 | 45 | 541 | 25 |
| Kagee2022 | 42.5 | 75 | 45 | 541 | 26 |
| Kagee2022 | 43.5 | 73 | 44 | 543 | 28 |
| Kagee2022 | 44.5 | 73 | 42 | 544 | 28 |
| Kagee2022 | 45.5 | 70 | 39 | 547 | 31 |
| Kagee2022 | 46.5 | 69 | 37 | 550 | 32 |
| Kagee2022 | 47.5 | 66 | 35 | 551 | 35 |
| KrugerGottschalk2017 | 31 | 185 | 45 | 86 | 25 |
| KrugerGottschalk2017 | 32 | 183 | 43 | 88 | 27 |
| KrugerGottschalk2017 | 33 | 181 | 42 | 89 | 29 |
| Levitt2021 | 21.5 | 14 | 53 | 30 | 2 |
| Levitt2021 | 22.5 | 14 | 51 | 32 | 2 |
| Levitt2021 | 24 | 14 | 50 | 33 | 2 |
| Levitt2021 | 25.5 | 14 | 47 | 36 | 2 |
| Levitt2021 | 26.5 | 14 | 44 | 39 | 2 |
| Levitt2021 | 27.5 | 14 | 43 | 40 | 2 |
| Levitt2021 | 28.5 | 14 | 42 | 41 | 2 |
| Levitt2021 | 29.5 | 14 | 41 | 42 | 2 |
| Levitt2021 | 30.5 | 13 | 41 | 42 | 3 |
| Levitt2021 | 31.5 | 13 | 37 | 46 | 3 |
| Levitt2021 | 32.5 | 13 | 35 | 48 | 3 |
| Levitt2021 | 34 | 13 | 34 | 49 | 3 |
| Levitt2021 | 35.5 | 13 | 32 | 51 | 3 |
| Levitt2021 | 37 | 13 | 27 | 56 | 3 |
| Levitt2021 | 38.5 | 13 | 26 | 57 | 3 |
| Levitt2021 | 39.5 | 13 | 24 | 59 | 3 |
| Levitt2021 | 40.5 | 13 | 21 | 62 | 3 |
| Levitt2021 | 42 | 13 | 19 | 64 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| Levitt2021 | 43.5 | 13 | 19 | 64 | 3 |
| Levitt2021 | 44.5 | 11 | 18 | 65 | 5 |
| Levitt2021 | 45.5 | 10 | 16 | 67 | 6 |
| Levitt2021 | 46.5 | 10 | 15 | 68 | 6 |
| Levitt2021 | 47.5 | 9 | 15 | 68 | 7 |
| MartinezLevy2021 | 21 | 26 | 27 | 37 | 1 |
| MartinezLevy2021 | 22 | 26 | 27 | 37 | 1 |
| MartinezLevy2021 | 23 | 26 | 25 | 39 | 1 |
| MartinezLevy2021 | 24 | 26 | 24 | 40 | 1 |
| MartinezLevy2021 | 25 | 26 | 21 | 43 | 1 |
| MartinezLevy2021 | 26 | 26 | 19 | 45 | 1 |
| MartinezLevy2021 | 27 | 26 | 17 | 47 | 1 |
| MartinezLevy2021 | 28 | 24 | 17 | 47 | 3 |
| MartinezLevy2021 | 29 | 24 | 15 | 49 | 3 |
| MartinezLevy2021 | 30 | 22 | 15 | 49 | 5 |
| MartinezLevy2021 | 31 | 22 | 15 | 49 | 5 |
| MartinezLevy2021 | 32 | 21 | 14 | 50 | 6 |
| MartinezLevy2021 | 33 | 19 | 13 | 51 | 8 |
| MartinezLevy2021 | 34 | 19 | 13 | 51 | 8 |
| MartinezLevy2021 | 35 | 18 | 13 | 51 | 9 |
| Morrison2021 | 22 | 81 | 36 | 16 | 0 |
| Morrison2021 | 23 | 80 | 33 | 19 | 2 |
| Morrison2021 | 25 | 80 | 31 | 21 | 2 |
| Morrison2021 | 26 | 76 | 30 | 22 | 5 |
| Morrison2021 | 28 | 76 | 27 | 24 | 5 |
| Morrison2021 | 31 | 76 | 26 | 26 | 5 |
| Morrison2021 | 32 | 76 | 24 | 27 | 5 |
| Morrison2021 | 33 | 76 | 24 | 27 | 5 |
| Morrison2021 | 34 | 76 | 22 | 30 | 5 |
| Morrison2021 | 35 | 76 | 22 | 30 | 5 |
| Morrison2021 | 36 | 76 | 21 | 31 | 5 |
| Morrison2021 | 37 | 75 | 19 | 33 | 6 |
| Morrison2021 | 38 | 71 | 17 | 35 | 10 |
| Morrison2021 | 39 | 68 | 16 | 36 | 13 |
| Morrison2021 | 40 | 68 | 16 | 36 | 13 |
| Morrison2021 | 41 | 67 | 10 | 41 | 15 |
| Morrison2021 | 43 | 65 | 10 | 41 | 16 |
| Morrison2021 | 44 | 65 | 10 | 41 | 16 |
| Morrison2021 | 45 | 62 | 10 | 41 | 19 |
| Morrison2021 | 46 | 58 | 10 | 41 | 24 |
| Morrison2021 | 47 | 54 | 9 | 43 | 27 |
| Morrison2021 | 48 | 48 | 9 | 43 | 33 |
| Murphy2017 | 21 | 171 | 37 | 18 | 15 |
| Murphy2017 | 22 | 171 | 34 | 22 | 15 |
| Murphy2017 | 23 | 171 | 33 | 23 | 15 |
| Murphy2017 | 24 | 170 | 33 | 23 | 17 |

| | | | | | |
|---|---|---|---|---|---|
| Murphy2017 | 25 | 170 | 33 | 23 | 17 |
| Murphy2017 | 26 | 170 | 32 | 24 | 17 |
| Murphy2017 | 27 | 170 | 30 | 26 | 17 |
| Murphy2017 | 28 | 170 | 30 | 26 | 17 |
| Murphy2017 | 29 | 170 | 29 | 27 | 17 |
| Murphy2017 | 30 | 168 | 27 | 29 | 19 |
| Murphy2017 | 31 | 168 | 27 | 29 | 19 |
| Murphy2017 | 32 | 168 | 24 | 31 | 19 |
| Murphy2017 | 33 | 168 | 22 | 34 | 19 |
| Murphy2017 | 34 | 166 | 21 | 35 | 20 |
| Murphy2017 | 35 | 164 | 21 | 35 | 22 |
| Murphy2017 | 36 | 160 | 18 | 37 | 26 |
| Murphy2017 | 37 | 158 | 18 | 37 | 28 |
| Murphy2017 | 38 | 155 | 17 | 38 | 32 |
| Murphy2017 | 39 | 153 | 17 | 38 | 34 |
| Murphy2017 | 40 | 151 | 16 | 40 | 35 |
| Murphy2017 | 41 | 151 | 16 | 40 | 35 |
| Murphy2017 | 42 | 149 | 16 | 40 | 37 |
| Murphy2017 | 43 | 147 | 16 | 40 | 39 |
| Murphy2017 | 44 | 140 | 16 | 40 | 47 |
| Murphy2017 | 45 | 138 | 16 | 40 | 48 |
| Murphy2017 | 46 | 134 | 14 | 41 | 52 |
| Murphy2017 | 47 | 129 | 14 | 41 | 58 |
| Murphy2017 | 48 | 123 | 13 | 42 | 63 |
| PereiraLima2019 | 21 | 34 | 24 | 27 | 0 |
| PereiraLima2019 | 28 | 33 | 23 | 28 | 1 |
| PereiraLima2019 | 34 | 33 | 18 | 33 | 1 |
| PereiraLima2019 | 35 | 32 | 16 | 35 | 2 |
| PereiraLima2019 | 36 | 32 | 15 | 36 | 2 |
| PereiraLima2019 | 37 | 31 | 14 | 37 | 3 |
| PereiraLima2019 | 41 | 27 | 14 | 37 | 7 |
| PereiraLima2019 | 42 | 27 | 13 | 38 | 7 |
| PereiraLima2019 | 43 | 26 | 11 | 40 | 8 |
| PereiraLima2019 | 45 | 23 | 9 | 42 | 11 |
| Price2016 | 30 | 41 | 72 | 20 | 0 |
| Price2016 | 35 | 38 | 65 | 27 | 3 |
| Price2016 | 38 | 37 | 60 | 32 | 4 |
| Price2016 | 40 | 37 | 59 | 33 | 4 |
| Price2016 | 45 | 32 | 51 | 40 | 9 |
| Roberts2021 | 25.5 | 138 | 46 | 29 | 3 |
| Roberts2021 | 26.5 | 138 | 44 | 31 | 3 |
| Roberts2021 | 27.5 | 137 | 44 | 31 | 4 |
| Roberts2021 | 28.5 | 135 | 43 | 32 | 6 |
| Roberts2021 | 29.5 | 135 | 40 | 35 | 6 |
| Roberts2021 | 30.5 | 134 | 40 | 35 | 7 |
| Roberts2021 | 32 | 134 | 37 | 38 | 7 |

| | | | | | |
|---|---|---|---|---|---|
| Roberts2021 | 33.5 | 134 | 36 | 39 | 7 |
| Roberts2021 | 34.5 | 134 | 35 | 40 | 7 |
| Roberts2021 | 35.5 | 133 | 35 | 40 | 8 |
| Roberts2021 | 36.5 | 130 | 33 | 42 | 11 |
| Roberts2021 | 37.5 | 130 | 30 | 45 | 11 |
| Roberts2021 | 38.5 | 130 | 29 | 46 | 11 |
| Roberts2021 | 39.5 | 130 | 27 | 48 | 11 |
| Roberts2021 | 40.5 | 128 | 26 | 49 | 13 |
| Roberts2021 | 41.5 | 128 | 24 | 51 | 16 |
| Roberts2021 | 42.5 | 126 | 22 | 53 | 16 |
| Roberts2021 | 43.5 | 124 | 21 | 54 | 17 |
| Roberts2021 | 44.1 | 123 | 20 | 55 | 18 |
| Roberts2021 | 44.6 | 121 | 20 | 55 | 20 |
| Rosendahl2019 | 20.5 | 8 | 8 | 65 | 2 |
| Rosendahl2019 | 21.5 | 8 | 5 | 68 | 2 |
| Rosendahl2019 | 23 | 7 | 5 | 68 | 3 |
| Rosendahl2019 | 25.5 | 7 | 4 | 69 | 3 |
| Rosendahl2019 | 27.5 | 7 | 3 | 70 | 3 |
| Rosendahl2019 | 29 | 6 | 3 | 70 | 4 |
| Rosendahl2019 | 32 | 5 | 3 | 70 | 5 |
| Rosendahl2019 | 33 | 5 | 3 | 70 | 5 |
| Rosendahl2019 | 35 | 5 | 2 | 71 | 5 |
| Rosendahl2019 | 37 | 4 | 2 | 71 | 6 |
| Rosendahl2019 | 40.5 | 3 | 2 | 71 | 7 |
| Rosendahl2019 | 43.5 | 3 | 1 | 72 | 7 |
| Rosendahl2019 | 47 | 2 | 1 | 72 | 8 |
| Verhey2018 | 21 | 34 | 96 | 68 | 6 |
| Verhey2018 | 22 | 34 | 92 | 72 | 6 |
| Verhey2018 | 23 | 34 | 89 | 75 | 6 |
| Verhey2018 | 24 | 34 | 87 | 77 | 6 |
| Verhey2018 | 25 | 34 | 83 | 81 | 6 |
| Verhey2018 | 26 | 34 | 76 | 88 | 6 |
| Verhey2018 | 27 | 33 | 73 | 91 | 7 |
| Verhey2018 | 28 | 31 | 70 | 94 | 9 |
| Verhey2018 | 29 | 31 | 63 | 101 | 9 |
| Verhey2018 | 30 | 31 | 57 | 107 | 9 |
| Verhey2018 | 31 | 31 | 55 | 109 | 9 |
| Verhey2018 | 32 | 31 | 50 | 114 | 9 |
| Verhey2018 | 33 | 30 | 48 | 116 | 10 |
| Verhey2018 | 34 | 30 | 47 | 117 | 10 |
| Verhey2018 | 35 | 30 | 45 | 119 | 10 |
| Verhey2018 | 37 | 29 | 44 | 120 | 11 |
| Verhey2018 | 38 | 28 | 41 | 123 | 12 |
| Verhey2018 | 40 | 27 | 40 | 124 | 13 |
| Verhey2018 | 41 | 26 | 33 | 131 | 14 |
| Verhey2018 | 42 | 25 | 32 | 132 | 15 |

| | | | | | |
|---|---|---|---|---|---|
| Verhey2018 | 44 | 24 | 32 | 132 | 16 |
| Verhey2018 | 45 | 23 | 32 | 132 | 17 |

**G. Journal of Affective Disorders Author Information Pack**

JOURNAL OF AFFECTIVE DISORDERS

AUTHOR INFORMATION PACK

## Description

*The Journal of Affective Disorders* publishes papers concerned with **affective disorders** in the widest sense: **depression, mania, anxiety and panic**. It is interdisciplinary and aims to bring together different approaches for a diverse readership. High quality papers will be accepted dealing with any aspect of affective disorders, including biochemistry, pharmacology, endocrinology, genetics, statistics, epidemiology, psychodynamics, classification, clinical studies and studies of all types of treatment.

## Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

### Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address

All necessary files have been uploaded:
*Manuscript*:
• Include keywords
• All figures (include relevant captions)
• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
• Indicate clearly if color should be used for any figures in print
*Author Statement* Contributors, Role of the Funding Source and Acknowledgements are mandatory and must be retained in the Author Statement (submission file type) under their respective headings.
*Graphical Abstracts / Highlights files* (where applicable)
*Supplemental files* (where applicable)

Further considerations
• Manuscript has been 'spell checked' and 'grammar checked'
• All references mentioned in the Reference List are cited in the text, and vice versa
• Permission has been obtained for use of copyrighted material from other sources (including the Internet)
• A competing interests statement is provided, even if the authors have no competing interests to declare

• Journal policies detailed in this guide have been reviewed
• Referee suggestions and contact details provided, based on journal requirements

For further information, visit our Support Center.

## Before You Begin

### Ethics in publishing

Please see our information on Ethics in publishing.

### Ethical Considerations

Authors of reports on human studies, especially those involving placebo, symptom provocation, drug discontinuation, or patients with disorders that may impair decision-making capability, should consider the ethical issues related to the work presented and include (in the Methods and Materials section of their manuscript) detailed information on the informed consent process, including the method or methods used to assess the subject's capacity to give informed consent, and safeguards included in the study design for protection of human subjects. Specifically, authors should consider all ethical issues relevant to their research, and briefly address each of these in their reports. When relevant patient follow-up data are available, this should also be reported. Specifically, investigators reporting on research involving human subjects or animals must have prior approval from an institutional review board. This approval should be mentioned in the methods section of the manuscript. In countries where institutional review boards are not available; the authors must include a statement that research was conducted in accordance with the Helsinki Declaration as revised 1989. All studies involving animals must state that the authors followed the guidelines for the use and care of laboratory animals of the author's institution or the National Research Council or any national law pertaining to animal research care.

### Declaration of interest

All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double anonymized) or the manuscript file (if single anonymized). If there are no interests to declare then please state this: 'Declarations of interest: none'. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. More information.

### Declaration of generative AI in scientific writing

The below guidance only refers to the writing process, and not to the use of AI tools to analyse and draw insights from data as part of the research process.

Where authors use generative artificial intelligence (AI) and AI-assisted technologies in the writing process, authors should only use these technologies to improve readability and language. Applying the technology should be done with human oversight and control, and authors should carefully review and edit the result, as AI can generate authoritative-sounding output that can be incorrect, incomplete or biased. AI and AI-assisted technologies should not be listed as an author or co-author, or be cited as an author. Authorship implies responsibilities and tasks that can only be attributed to and performed by humans, as outlined in Elsevier's AI policy for authors.

Authors should disclose in their manuscript the use of AI and AI-assisted technologies in the writing process by following the instructions below. A statement will appear in the published work. Please note that authors are ultimately responsible and accountable for the contents of the work.

***Disclosure instructions***
Authors must disclose the use of generative AI and AI-assisted technologies in the writing process by adding a statement at the end of their manuscript in the core manuscript file, before the References list. The statement should be placed in a new section entitled 'Declaration of Generative AI and AI-assisted technologies in the writing process'.

*Statement: During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.*

This declaration does not apply to the use of basic tools for checking grammar, spelling, references etc. If there is nothing to disclose, there is no need to add a statement.

**Submission Declaration**

Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service Crossref Similarity Check.

***Preprints***
Please note that preprints can be shared anywhere at any time, in line with Elsevier's sharing policy. Sharing your preprints e.g. on a preprint server will not

count as prior publication (see 'Multiple, redundant or concurrent publication' for more information).

## Use of inclusive language

Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Content should make no assumptions about the beliefs or commitments of any reader; contain nothing which might imply that one individual is superior to another on the grounds of age, gender, race, ethnicity, culture, sexual orientation, disability or health condition; and use inclusive language throughout. Authors should ensure that writing is free from bias, stereotypes, slang, reference to dominant culture and/or cultural assumptions. We advise to seek gender neutrality by using plural nouns ("clinicians, patients/clients") as default/wherever possible to avoid using "he, she," or "he/she." We recommend avoiding the use of descriptors that refer to personal attributes such as age, gender, race, ethnicity, culture, sexual orientation, disability or health condition unless they are relevant and valid. When coding terminology is used, we recommend to avoid offensive or exclusionary terms such as "master", "slave", "blacklist" and "whitelist". We suggest using alternatives that are more appropriate and (self-) explanatory such as "primary", "secondary", "blocklist" and "allowlist". These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

## Reporting sex- and gender-based analyses

### *Reporting guidance*

For research involving or pertaining to humans, animals or eukaryotic cells, investigators should integrate sex and gender-based analyses (SGBA) into their research design according to funder/sponsor requirements and best practices within a field. Authors should address the sex and/or gender dimensions of their research in their article. In cases where they cannot, they should discuss this as a limitation to their research's generalizability. Importantly, authors should explicitly state what definitions of sex and/or gender they are applying to enhance the precision, rigor and reproducibility of their research and to avoid ambiguity or conflation of terms and the constructs to which they refer (see Definitions section below). Authors can refer to the Sex and Gender Equity in Research (SAGER) guidelines and the SAGER guidelines checklist. These offer systematic approaches to the use and editorial review of sex and gender information in study design, data analysis, outcome reporting and research interpretation - however, please note there is no single, universally agreed-upon set of guidelines for defining sex and gender.

### *Definitions*

Sex generally refers to a set of biological attributes that are associated with physical and physiological features (e.g., chromosomal genotype, hormonal levels, internal and external anatomy). A binary sex categorization (male/female) is usually designated at birth ("sex assigned at birth"), most often based solely on the visible external anatomy of a newborn. Gender generally refers to socially constructed roles, behaviors, and identities of women, men and gender-diverse people that occur in a historical and cultural context and may vary across societies and over time. Gender influences how people view themselves and each other, how they behave

and interact and how power is distributed in society. Sex and gender are often incorrectly portrayed as binary (female/male or woman/man) and unchanging whereas these constructs actually exist along a spectrum and include additional sex categorizations and gender identities such as people who are intersex/have differences of sex development (DSD) or identify as non-binary. Moreover, the terms "sex" and "gender" can be ambiguous—thus it is important for authors to define the manner in which they are used. In addition to this definition guidance and the SAGER guidelines, the resources on this page offer further insight around sex and gender in research studies.

## Contributors

Each author is required to declare their individual contribution to the article: all authors must have materially participated in the research and/or article preparation, so roles for all authors should be described. The statement that all authors have approved the final article should be true and included in the disclosure.

## Changes to authorship

Authors are expected to consider carefully the list and order of authors **before** submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only **before** the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the **corresponding author**: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.
Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors **after** the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

### *Article transfer service*

This journal uses the Elsevier Article Transfer Service to find the best home for your manuscript. This means that if an editor feels your manuscript is more suitable for an alternative journal, you might be asked to consider transferring the manuscript to such a journal. The recommendation might be provided by a Journal Editor, a dedicated Scientific Managing Editor, a tool assisted recommendation, or a combination. If you agree, your manuscript will be transferred, though you will have the opportunity to make changes to the manuscript before the submission is complete. Please note that your manuscript will be independently reviewed by the new journal. More information.

## Copyright

Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see more information on this). An e-mail will be sent to the

corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. Permission of the Publisher is required for resale or distribution outside the institution and for all other derivative works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases.

For gold open access articles: Upon acceptance of an article, authors will be asked to complete a 'License Agreement' (more information). Permitted third party reuse of gold open access articles is determined by the author's choice of user license.

***Author rights***
As an author you (or your employer or institution) have certain rights to reuse your work. More information.

***Elsevier supports responsible sharing***
Find out how you can share your research published in Elsevier journals.

**Role of the funding source**

You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement, it is recommended to state this.

**Open access**

Please visit our Open Access page for more information.

***Elsevier Researcher Academy***
Researcher Academy is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

***Language (usage and editing services)***
Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the Language Editing service available from Elsevier's Language Services.

## Submission

Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

## Manuscript Submission

The *Journal of Affective Disorders* now proceeds totally online via an electronic submission system. Mail submissions will no longer be accepted. By accessing the online submission system, https://www.editorialmanager.com/JAFD/default.aspx, you will be guided stepwise through the creation and uploading of the various files. When submitting a manuscript online, authors need to provide an electronic version of their manuscript and any accompanying figures and tables.

The author should select from a list of scientific classifications, which will be used to help the editors select reviewers with appropriate expertise, and an article type for their manuscript. Once the uploading is done, the system automatically generates an electronic (PDF) proof, which is then used for reviewing. All correspondence, including the Editor's decision and request for revisions, will be processed through the system and will reach the corresponding author by e-mail.

Once a manuscript has successfully been submitted via the online submission system authors may track the status of their manuscript using the online submission system (details will be provided by e-mail). If your manuscript is accepted by the journal, subsequent tracking facilities are available on Elsevier's Author Gateway, using the unique reference number provided by Elsevier and corresponding author name (details will be provided by e-mail).

Authors may send queries concerning the submission process or journal procedures to our Editors-in-Chief

**Paolo Brambilla: paolo.brambilla1@unimi.it or Jair Soares: Jair.C.Soares@uth.tmc.edu.**

Please submit your article via https://www.editorialmanager.com/JAFD/default.aspx.

***Types of Papers***
The Journal primarily publishes:

Full-Length Research Papers (up to 5000 words, excluding references and up to 6 tables/figures)

Review Articles and Meta-analyses (up to 8000 words, excluding references and up to 10 tables/figures)

Short Communications (up to 2000 words, 20 references, 2 tables/figures)

Correspondence (up to 1000 words, 10 references, 1 table/figure).

At the discretion of the accepting Editor-in-Chief, and/or based on reviewer feedback, authors may be allowed fewer or more than these guidelines.

***Retraction Policy***
It is a general principle of scholarly communication that the editor of a learned journal is solely and independently responsible for deciding which articles submitted to the journal shall be published. In making this decision the editor is guided by policies of the journal's editorial board and constrained by such legal requirements in force regarding libel, copyright infringement and plagiarism. Although electronic methods are available to detect plagiarism and duplicate publications, editors nonetheless rely in large part on the integrity of authors to fulfil their responsibilities within the requirements of publication ethics and only submit work to which the can rightfully claim authorship and which has not previously been published.

An outcome of this principle is the importance of the scholarly archive as a permanent, historic record of the transactions of scholarship. Articles that have been published shall remain extant, exact and unaltered as far as is possible. However, very occasionally circumstances may arise where an article is published that must later be retracted or even removed. Such actions must not be undertaken lightly and can only occur under exceptional circumstances, such as: • Article Withdrawal: Only used for Articles in Press which represent early versions of articles and sometimes contain errors, or may have been accidentally submitted twice. Occasionally, but less frequently, the articles may represent infringements of professional ethical codes, such as multiple submission, bogus claims of authorship, plagiarism, fraudulent use of data or the like. • Article Retraction: Infringements of professional ethical codes, such as multiple submission, bogus claims of authorship, plagiarism, fraudulent use of data or the like. Occasionally a retraction will be used to correct errors in submission or publication. • Article Removal: Legal limitations upon the publisher, copyright holder or author(s). • Article Replacement: Identification of false or inaccurate data that, if acted upon, would pose a serious health risk. For the full policy and further details, please refer https://www.elsevier.com/about/publishing-guidelines/policies/article-withdrawal

***Suggesting reviewers***
Please submit the names and institutional e-mail addresses of several potential reviewers.

You should not suggest reviewers who are colleagues, or who have co-authored or collaborated with you during the last three years. Editors do not invite reviewers who have potential competing interests with the authors. Further, in order to provide a broad and balanced assessment of the work, and ensure scientific rigor, please suggest diverse candidate reviewers who are located in different countries/regions from the author group. Also consider other diversity attributes e.g. gender, race and ethnicity, career stage, etc. Finally, you should not include existing members of the journal's editorial team, of whom the journal are already aware.

Note: the editor decides whether or not to invite your suggested reviewers.

## Preparation of Manuscripts

Articles should be in English. The title page should appear as a separate sheet bearing title (without article type), author names and affiliations, and a footnote with the corresponding author's full contact information, including address, telephone and fax numbers, and e-mail address (failure to include an e-mail address can delay processing of the manuscript).

Papers should be divided into sections headed by a caption (e.g., Introduction, Methods, Results, Discussion). A structured abstract of no more than 250 words should appear on a separate page with the following headings and order: Background, Methods, Results, Limitations, Conclusions (which should contain a statement about the clinical relevance of the research). A list of three to six key words should appear under the abstract. **Authors should note that the 'limitations' section both in the discussion of the paper AND IN A STRUCTURED ABSTRACT are essential. Failure to include it may delay in processing the paper, decision making and final publication.**

## Figures and Photographs

Figures and Photographs of good quality should be submitted online as a separate file. Please use a lettering that remains clearly readable even after reduction to about 66%. For every figure or photograph, a legend should be provided. All authors wishing to use illustrations already published must first obtain the permission of the author and publisher and/or copyright holders and give precise reference to the original work. This permission must include the right to publish in electronic media.

## Tables

Tables should be numbered consecutively with Arabic numerals and must be cited in the text in sequence. Each table, with an appropriate brief legend, comprehensible without reference to the text, should be typed on a separate page and uploaded online. Tables should be kept as simple as possible and wherever possible a graphical representation used instead. Table titles should be complete but brief. Information other than that defining the data should be presented as footnotes.

Please refer to the generic Elsevier artwork instructions: http://authors.elsevier.com/artwork/jad.

## Preparation of supplementary data

Elsevier accepts electronic supplementary material to support and enhance your scientific research. Supplementary files offer the author additional possibilities to publish supporting applications, movies, animation sequences, high-resolution images, background datasets, sound clips and more.

Supplementary files supplied will be published online alongside the electronic version of your article in Elsevier web products, including ScienceDirect: https://www.sciencedirect.com. In order to ensure that your submitted material is directly usable, please ensure that data is provided in one of our

recommended file formats. Authors should submit the material in electronic format together with the article and supply a concise and descriptive caption for each file. For more detailed instructions please visit our Author Gateway at: https://www.elsevier.com/authors.

**Colour reproduction**

The Journal of Affective Disorders is now also included in a new initiative from Elsevier: 'Colourful e-Products'. Through this initiative, figures that appear in black & white in print can appear in colour, online, in ScienceDirect at https://www.sciencedirect.com.

There is no extra charge for authors who participate.

For colour reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article. Please indicate your preference for colour in print or on the Web only. Because of technical complications which can arise by converting colour figures to "grey scale" (for the printed version should you not opt for colour in print) please submit in addition usable black and white versions of all the colour illustrations. For further information on the preparation of electronic artwork, please see http://authors.elsevier.com/artwork/jad.

**Queries**

For questions about the editorial process (including the status of manuscripts under review) or for technical support on submissions, please visit our Support Center.

**Peer review**

This journal operates a single anonymized review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. Editors are not involved in decisions about papers which they have written themselves or have been written by family members or colleagues or which relate to products or services in which the editor has an interest. Any such submission is subject to all of the journal's usual procedures, with peer review handled independently of the relevant editor and their research groups. More information on types of peer review.

***Use of word processing software***
It is important that the file be saved in the native format of the word processor used. The text should be in single-column format. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. In particular, do not use the word processor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. When preparing tables, if you are using a table grid, use only one grid for each individual table and not a grid for each row. If no grid is used, use tabs, not spaces, to align columns. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). Note

that source files of figures, tables and text graphics will be required whether or not you embed your figures in the text. See also the section on Electronic artwork.
To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

## Highlights

Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the example Highlights.

Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

## Abstract

A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

### *Graphical abstract*

Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site.

## Keywords

Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

### *Abbreviations*

Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

***Acknowledgements***
Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

***Formatting of funding sources***
List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, it is recommended to include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

***Nomenclature and units***
Follow internationally accepted rules and conventions: use the international system of units (SI). If other quantities are mentioned, give their equivalent in SI. You are urged to consult IUPAC: Nomenclature of Organic Chemistry for further information.

***Math formulae***
Please submit math equations as editable text and not as images. Present simple formulae in line with normal text where possible and use the solidus (/) instead of a horizontal line for small fractional terms, e.g., X/Y. In principle, variables are to be presented in italics. Powers of e are often more conveniently denoted by exp. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).

***Footnotes***
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

**Artwork**

***Electronic artwork***
*General points*
• Make sure you use uniform lettering and sizing of your original artwork.

• Embed the used fonts if the application provides that option.
• Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
• Number the illustrations according to their sequence in the text.
• Use a logical naming convention for your artwork files.
• Provide captions to illustrations separately.
• Size the illustrations close to the desired dimensions of the published version.
• Submit each illustration as a separate file.
• Ensure that color images are accessible to all, including those with impaired color vision.

A detailed guide on electronic artwork is available.
**You are urged to visit this site; some excerpts from the detailed information are given here.**
*Formats*
If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.
Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):
EPS (or PDF): Vector drawings, embed all used fonts.
TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.
TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.
**Please do not:**
• Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
• Supply files that are too low in resolution;
• Submit graphics that are disproportionately large for the content.

***Color artwork***
Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. **For color reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article**. Please indicate your preference for color: in print or online only. Further information on the preparation of electronic artwork.

**Tables**

Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any

table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

## References

### *Citation in text*

Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

### *Data references*

This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

### *Preprint references*

Where a preprint has subsequently become available as a peer-reviewed publication, the formal publication should be used as the reference. If there are preprints that are central to your work or that cover crucial developments in the topic, but are not yet formally published, these may be referenced. Preprints should be clearly marked as such, for example by including the word preprint, or the name of the preprint server, as part of the reference. The preprint DOI should also be provided.

### *Reference management software*

Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley. Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. More information on how to remove field codes from different reference management software.

### *Reference style*

*Text:* All citations in the text should refer to:

1. *Single author:* the author's name (without initials, unless there is ambiguity) and the year of publication;

2. *Two authors:* both authors' names and the year of publication;
3. *Three or more authors:* first author's name followed by 'et al.' and the year of publication.
Citations may be made directly (or parenthetically). Groups of references can be listed either first alphabetically, then chronologically, or vice versa.
Examples: 'as demonstrated (Allan, 2000a, 2000b, 1999; Allan and Jones, 1999)…. Or, as demonstrated (Jones, 1999; Allan, 2000)… Kramer et al. (2010) have recently shown …'
*List:* References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters 'a', 'b', 'c', etc., placed after the year of publication.
*Examples:*
Reference to a journal publication:
Van der Geer, J., Hanraads, J.A.J., Lupton, R.A., 2010. The art of writing a scientific article. J. Sci. Commun. 163, 51–59. https://doi.org/10.1016/j.Sc.2010.00372.
Reference to a journal publication with an article number:
Van der Geer, J., Hanraads, J.A.J., Lupton, R.A., 2018. The art of writing a scientific article. Heliyon. 19, e00205. https://doi.org/10.1016/j.heliyon.2018.e00205.
Reference to a book:
Strunk Jr., W., White, E.B., 2000. The Elements of Style, fourth ed. Longman, New York.
Reference to a chapter in an edited book:
Mettam, G.R., Adams, L.B., 2009. How to prepare an electronic version of your article, in: Jones, B.S., Smith , R.Z. (Eds.), Introduction to the Electronic Age. E-Publishing Inc., New York, pp. 281–304.
Reference to a website:
Cancer Research UK, 1975. Cancer statistics reports for the UK. http://www.cancerresearchuk.org/aboutcancer/statistics/cancerstatsreport/ (accessed 13 March 2003).
Reference to a dataset:
[dataset] Oguro, M., Imahiro, S., Saito, S., Nakashizuka, T., 2015. Mortality data for Japanese oak wilt disease and surrounding forest compositions. Mendeley Data, v1. https://doi.org/10.17632/xwj98nb39r.1.
Reference to software:
Coon, E., Berndt, M., Jan, A., Svyatsky, D., Atchley, A., Kikinzon, E., Harp, D., Manzini, G., Shelef, E., Lipnikov, K., Garimella, R., Xu, C., Moulton, D., Karra, S., Painter, S., Jafarov, E., & Molins, S., 2020. Advanced Terrestrial Simulator (ATS) v0.88 (Version 0.88). Zenodo. https://doi.org/10.5281/zenodo.3727209.

**Video**

Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a

preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

**Data visualization**

Include interactive data visualizations in your publication and let your readers interact and engage more closely with your research. Follow the instructions here to find out about available data visualization options and how to include them with your article.

**Supplementary material**

Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

**Research data**

This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings, which may also include software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.

***Data linking***
If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

**Research Elements**

This journal enables you to publish research objects related to your original research – such as data, methods, protocols, software and hardware – as an additional paper in a Research Elements journal.

Research Elements is a suite of peer-reviewed, open access journals which make your research objects findable, accessible and reusable. Articles place research objects into context by providing detailed descriptions of objects and their application, and linking to the associated original research articles. Research Elements articles can be prepared by you, or by one of your collaborators.

During submission, you will be alerted to the opportunity to prepare and submit a manuscript to one of the Research Elements journals.

More information can be found on the Research Elements page.

***Data statement***
To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

**After Acceptance**

**Author disclosure**

Funding body agreements and policies Elsevier has established agreements and developed policies to allow authors whose articles appear in journals published by Elsevier, to comply with potential manuscript archiving requirements as specified as conditions of their grant awards. To learn more about existing agreements and policies please visit https://www.elsevier.com/fundingbodies

The second aspect of the Journal's new policy concerns the Conflict of Interest. ALL authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations

within three (3) years of beginning the work submitted that could inappropriately influence, or be perceived to influence, their work.

Examples of potential conflicts of interest which should be disclosed include employment, consultancies, stock ownership (except for personal investment purposes equal to the lesser of one percent (1%) or USD 5000), honoraria, paid expert testimony, patent applications, registrations, and grants. If there are no conflicts of interest, authors should state that there are none.

eg, Author Y owns shares in pharma company A. Author X and Z have consulted for pharma company B. All other authors declare that they have no conflicts of interest.

Finally, before the references, the Journal will publish Acknowledgements, in a separate section, and not as a footnote on the title page.

eg, We thank Mr A, who kindly provided the data necessary for our analysis, and Miss B, who assisted with the preparation and proof-reading of the manuscript.

The submitting author is also required to make a brief statement concerning each named author's contributions to the paper under the heading Contributors. This statement is for editorial purposes only and will not be published with the article.

eg, Author X designed the study and wrote the protocol. Author Y managed the literature searches and analyses. Authors X and Z undertook the statistical analysis, and author W wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

NB. During the online submission process the author will be prompted to upload these four mandatory author disclosures as separate items. They will be automatically incorporated in the PDF builder of the online submission system. Please do not include in the main manuscripts.

**Copyright Transfer**

Upon acceptance of an article, you will be asked to transfer copyright (for more information on copyright see http://wwww.elsevier.com/copyright). This transfer will ensure the widest possible dissemination of information. If excerpts from other copyrighted works are included in the submission, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases: contact Elsevier's Rights Department, Philadelphia, PA, USA: phone (+1) 215 238 7869, fax (+1) 215 238 2239, e-mail: healthpermissions@elsevier.com.

Requests for materials from other Elsevier publications may also be completed on-line via the Elsevier homepage https://www.elsevier.com/permissions

**Online proof correction**

To ensure a fast publication process of the article, we kindly ask authors to provide us with their proof corrections within two days. Corresponding authors will receive an

e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors.
If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF.
We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

**Reprints**

The corresponding author, at no cost, will be provided with a PDF file of the article via e-mail. The PDF file is a watermarked version of the published article and includes a cover sheet with the journal cover image and a disclaimer outlining the terms and conditions of use. There are no page charges.

Author enquiries: For enquiries relating to the submission of articles please visit Elsevier's Author Gateway at http://authors.elsevier.com/journal/jad. The Author Gateway also provides the facility to track accepted articles and set up e-mail alerts to inform you of when an article's status has changed, as well as detailed artwork guidelines, copyright information, frequently asked questions and more. Contact details for questions arising after acceptance of an article, especially those relating to proofs, are provided after registration of an article for publication.

**Offprints**

The corresponding author will, at no cost, receive a customized Share Link providing 50 days free access to the final published version of the article on ScienceDirect. The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

**H. NCMH Storyboard (including consent information and questionnaires)**

# National Centre for Mental Health (NCMH) Online Recruitment (Maternal Wellbeing, Mental Health and Experiences)

*Web-based Participant Information, Consent, and Questions*

## 1. Overview

This document sets out the structure of the National Centre for Mental Health (NCMH) online Maternal Wellbeing, Mental Health and Experiences survey. The proposed methods are in line with those approved for online data collection by NCMH more widely.

The participant information relevant to the Maternal Wellbeing, Mental Health and Experiences survey will be delivered to participants on the project website. This document describes the way in which the information will be presented (please see Section 2).

The participant information is split into general information about the study (Section 3.1) and more detailed information about the study (Section 3.2). Both sections are consistent with the information given via our traditional hard copy information sheets.

If after reviewing this information, potential participants wish to participate in the study, they will give their consent to join the study online. Details of this are provided in Section 4.

## 2. Website structure

The NCMH Maternal Wellbeing, Mental Health and Experiences survey recruitment home page will be hosted within the NCMH website, and the consent, participant information, and survey aspects hosted on a widely used online survey platform. The home page for the study will include the title of the study and images consistent with NCMH branding, which was developed in co-operation with people with lived experience of mental illness.

From this home page, potential participants will be given brief information about the study to allow them to decide whether or not they might be interested in joining. From this page they will be able to either leave (and do nothing) or continue to the survey site by clicking ‘Join Us’, where they would be given more information about the study (as detailed in Section 3) and will be asked to provide consent to take part (as detailed in Section 4). Participants will be informed that there is the option of giving participation further consideration and coming back at a later date.

This document will describe the information that will be presented to potential participants. The text that will go onto the webpage is highlighted in grey.

## 3. Information

### 3.1 General Information

About the Study
It is important to consider factors that may have an effect in pregnancy and in the first year after childbirth.

At NCMH we are trying to understand more about how life experiences impact on maternal wellbeing and mental health during this period.

If you decide to take part, we will ask you to provide us with some basic information about yourself, your mental health, wellbeing and your past experiences, as well as your experiences related to COVID-19. There is no obligation to take part and you do not need to answer any questions that you find upsetting.

We also want to identify people who would be willing to be approached about taking part in future mental health research projects.

What will I have to do?

Taking part is voluntary: it's up to you to choose if you want to sign up.

If you join us, you'll be asked whether you would be willing to:

Provide us with your contact details (e.g. address, email address and phone number) and some personal information (e.g. date of birth, ethnic group, and employment status).
Answer some questions about your wellbeing, current or recent pregnancy, mental health, your life experiences, and thoughts and feelings related to COVID-19. This will take approximately 20-30 minutes.
If recruited in pregnancy, allow us to contact you for follow up questionnaires within the next 2 weeks, at 1 month after your due date and at 6 months after your due date.
If recruited postnatally, allow us to contact you for follow up questionnaires within the next 2 weeks and in 6 months' time.
Be contacted every 6-12 months or so following this by the study team, to invite you to provide more information about your mental and physical health and your lifestyle.
Allow us to contact you in the future about other studies that you may want to take part in. There will be no obligation for you to take part in these future opportunities.
Allow us to share anonymous information with other researchers if they have scientific and ethical approval for the questions that they would like to answer.

We will use your answers to improve our understanding of the impact of life experiences on maternal wellbeing & mental health.

Please visit the NCMH website [link – see appendix 1] for information on organisations that you can call if you need some support.

Once you have joined, you can choose if you want to take part in any of the questionnaires, or studies, that we tell you about when we get in touch with you.

3.2 Detailed Information
(text to be included under hyperlinks)

Who is doing the study?
This study is led by the National Centre for Mental Health (NCMH). NCMH is a Welsh Government funded Research Centre, led by Cardiff, Swansea and Bangor Universities. It is being funded by Health and Care Research Wales, Welsh Government. The Director of the National Centre for Mental Health is Professor Ian Jones.

How can I join the study?
You will have the opportunity to join the study once you have read through and understand the information.

What are the possible benefits of taking part?
We hope that learning more about the impact of life experiences on maternal wellbeing and mental health will lead to new and improved ways of recognising and providing support in times of need. However, these remain long-term aims and you will not benefit directly from taking part in this study.

What are the possible disadvantages and risks of taking part?

This survey may involve answering questions that some people may find distressing. You do not need to answer any of these questions if doing so would be upsetting. Please visit the NCMH website [link – see appendix 1] for information on organisations that you can call if you need some support.

Who will have access to my information?
Only the study team will have access to your data and only they will contact you directly.

All information collected during the course of the research will be kept strictly confidential. There are strict laws that safeguard your privacy at every stage. In accordance with the Data Protection Act and the General Data Protection Regulation (GDPR), your personal information will be kept confidential by assigning a unique study code to your data. Your name and identifying information will not be passed on to anyone.

What questions will I be asked now?
When you agree to take part and sign up, you will be asked to provide contact details and some other information about yourself such as your age and ethnic group. You will also be asked to answer some questions about your wellbeing, current or recent

pregnancy, mental health, your life experiences, as well as your experiences related to COVID-19.

How often will I be contacted?
After this initial assessment, we will contact you about completing the follow up assessment within the next 2 weeks and then if you are currently pregnant we will contact you at 2 time points in the first year after childbirth. If you have recently given birth, we will contact you again in 6 months' time. These follow ups will be to ask you more questions about your experiences, your mental and general health and lifestyle. Sometimes we will ask for information that you haven't given before. Sometimes we will ask you the same questions as before, so that we can see how things have changed.

As well as this regular contact, the study team may contact you from time to time, to ask you to take part in new studies. You may be contacted because of something that you have told us about (for example, your age). These studies may be conducted by other research teams. We will give you more information about these studies including why the research is being carried out, what you might be asked to do and how to sign up. It is up to you to decide whether you want to take part in these new studies. It won't affect your participation in the overall NCMH Maternal Wellbeing, Mental Health, and life experiences survey if you prefer not to get involved.

How long will it take?
First you need to join the study. This involves reading this information and then consenting below. This should take about 5 minutes. Take as much time as you need to decide whether you wish to take part.

Once you have joined, you will be asked some questions. This should take about 20-30 minutes to finish. We know that we get the best data if you are able to complete these questions in one go, but if for some reason this isn't possible then you can come back to the website later because you can save your answers once you have finished a set of questions.

Can I decline or withdraw from the study?
You do not have to take part in this study. If you do decide to take part you are still free to withdraw at any time without giving a reason. If you decide to withdraw from this study, all details you have provided will be destroyed. These will not be used further in the research.

What happens when the study is finished?
This is a long term study that will allow us to learn about the impact of life experiences on maternal wellbeing and mental health. The information you provide will be stored for use on a long term basis (at least 15 years).

You will not have any claim to any future commercial use of results from the study in which your data has been used. To make best use of resources we will share data (anonymised to exclude any personal details) with different groups of researchers from the NHS, universities and commercial companies, both within the UK and abroad. However, we would stress that those organizations will never obtain access to personal/ identifying information (for example, your name, address, date of birth).

Who has reviewed the study?
Ethical approval has been obtained from the National Research Ethics Service and NHS (Research and Development) permission has also been obtained.

If you have further questions about the study please contact the study team:
National Centre for Mental Health
Cardiff University
Hadyn Ellis Building,
Maindy Road, Cathays,
Cardiff
CF24 4HQ

Phone 029 20688401

Fax 029 20687100

Email info@ncmh.info

If you would like to discuss this study with someone independent of the study please contact:
Vanessa Davies
Institute Manager
Neuroscience and Mental Health Research Institute
3rd Floor, Hadyn Ellis Building
Maindy Road
CARDIFF
CF24 4HQ
Phone 029 20688340
Email **daviesvj@cardiff.ac.uk**

4. Joining the Study

The information to be included on the “Join the Study” section on the online survey platform is included below. There will be text stating that participation is voluntary, outlining what participants are consenting to, and a declaration that they have read the participant information and are of an appropriate age. There will be a space for them to input their email address and an “I agree” button, which they will be asked to press if they agree to take part. Once they have clicked “I agree” button, an email will be sent welcoming the participant to the study and enclosing the information about the study (above).

Once they have pressed the “I Agree” button, they will be taken to a page where they will be asked for some additional questions focusing on personal information (e.g. name, contact information, gender, date of birth, ethnicity), their current or recent pregnancy (e.g. due date, pregnancy/birth complications), their wellbeing and mental health (e.g. diagnosis), life experiences (past experiences, thoughts and attitudes) and their experiences of COVID-19 (thoughts, expectations and actions). Once entered, this personal information will be stored in a secure database.

Text to be included on this page: “Join the Study”

IT IS VERY IMPORTANT THAT YOU READ THE INFORMATION BELOW BEFORE CLICKING THE “I Agree” BUTTON

If, after reading this information, you would like to take part, you can agree to join the study by clicking on the 'I Agree' button.

Taking part in the National Centre for Mental Health Maternal Wellbeing, Mental Health and life experiences survey is voluntary. If you join and then change your mind, you can leave the study at any time. If you would prefer not to sign up now (for example, because you would like to discuss this with someone else), you can come back to this page later.

We will keep the information that you share with us. It will be held securely by the National Centre for Mental Health research team at Cardiff University. The study has been approved by the Multicentre Research Ethics Committee[1] for Wales.

By clicking on the “I Agree” button, you agree to:
Provide your contact details (name, postcode, email address, phone number) and some details about you (sex, date of birth, ethnic group).
Answer some questions about your wellbeing, current or recent pregnancy, mental health, your life experiences, and thoughts and feelings related to COVID-19.

[1] Include a pop-up here to define ethics committee: “An ethics committee is a committee of experts and members of the public that reviews and monitors medical research involving people.”

Be contacted with regards to a follow up within the next 2 weeks and then at 1, and 6 months after your childbirth by the study team if you are currently pregnant, or in 6 months if you have recently given birth. This contact will be to invite you to provide more information about your mental and physical health, wellbeing and your lifestyle.
Be contacted every 6-12 months or so following this by the study team, to invite you to provide more information about your mental and physical and your lifestyle.
Allow us to link the information you provide to routinely collected, anonymised datasets (such as those held in the Secure Anonymised Information Linkage (SAIL) databank), in order to answer future research questions related to mental health. The data within any such dataset will be fully anonymised and you would not be identifiable in any way.
Be contacted by the study team who will provide updates about the NCMH research and let you know about other studies that you may want to take part in (for example, via our NCMH newsletters).
Allow us to share anonymous[2] information with other researchers.

By clicking on the "I Agree" button, you also declare that:
You have read and understood the information about this study
You are aged 18+
You are either currently pregnant or have given birth in the last 12 months

If you have any questions or would like more information about the study or the information that has been provided, please ring our phone number (NUMBER, OPENING HOURS) or email us (EMAIL, OPENING HOURS). Outside these hours, please feel free to leave us a message, which we will respond to as soon as we can.

Now that you understand what is involved, do you agree to take part in the National Centre for Mental Health Maternal Wellbeing, Mental Health and Life Experiences Survey? If you click 'I Agree' you will be forwarded to the short online survey which will take approximately [TIME] minutes to complete. You will also be emailed a copy of this information.

| | |
|---|---|
| Enter email address | |
| Confirm email address | |

I Agree

A copy of the information sheet will be emailed to the participant.

If you do not want to take part, you do not have to do anything.

[2] Include a pop-up here to define anonymous: "Information where any detail that could be used to identify you has been removed"

If you do not want to take part right now, you are free to come back at a later date. Thank you for reading this far.

5. Basic Assessment
Text:
“Many thanks for agreeing to join the National Centre for Mental Health (NCMH) Maternal Wellbeing, Mental Health and Life Experiences survey. We ask people who are willing to take part in our study, if they would be kind enough to answer some questions about their wellbeing, current or recent pregnancy, mental health, your life experiences, and your experiences related to COVID-19.
These questions should take roughly 20-30 minutes to complete. Please remember to click ‘Submit’ even if you haven’t completed all of the questions.
If you have any questions or would like further information, please contact us on (PHONE NUMBER) or (EMAIL ADDRESS).
Once again, thank you very much for helping with our research. Together we can make a difference for maternal wellbeing and mental health.

*ALL PARTICIPANTS*

Questions about you:
[*] First name (mandatory)
[*] Surname (mandatory)
[*] Previous or maiden names
[*] Date of Birth (mandatory)
[*] Age
[*] Sex
[*] Gender Identity
[*] Address
[*] Home phone
[*] Mobile phone
[*] NHS Number (if known)
[*] Ethnic origin

[*] Sexual orientation
Heterosexual or straight
Gay or lesbian
Bisexual
Not sure
Other
Prefer not to answer

[*] Are you currently on Maternity Leave?

Yes/No

[*] How would you describe your most recent state of employment? *This may be currently if you are not on maternity leave or in the period before you took maternity leave.*

Employed (including being on temporary leave from work for any reason)
Self-employed or freelance
Out of work looking for work
Out of work but not currently looking for work
A homemaker
A student
Volunteering
Unable to work (including those receiving Disability Living Allowance (DLA))

[*] What is your highest level of education?

- ☐ 'No qualifications': No academic or professional qualifications.
- ☐ '1-4 GCSEs or equivalent':1-4 O Levels/CSE/GCSEs (any grades), Entry Level, Foundation Diploma, NVQ level 1, Foundation GNVQ, Basic/Essential Skills.
- ☐ '5+ GCSEs or equivalent': 5+ O Level (Passes)/CSEs (Grade 1)/ GCSEs (Grades A*-C), School Certificate, 1 A Level/ 2-3 AS Levels/VCEs, Intermediate/Higher Diploma, Welsh Baccalaureate Intermediate Diploma, NVQ level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma, RSA Diploma.
- ☐ 'Apprenticeship': Apprenticeship.
- ☐ '2+ A Levels or equivalent' (Level 3 qualifications): 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced Diploma, WelshBaccalaureate Advanced Diploma, NVQ Level 3; Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC National, RSA Advanced Diploma.
- ☐ 'Degree level or above' (Level 4 qualifications and above): Degree (for example BA, BSc), Higher Degree (for example MA, PhD, PGCE), NVQ Level 4-5, HNC, HND, RSA Higher, Diploma, BTEC Higher level, Foundation degree (NI), Professional qualifications (for example teaching, nursing, accountancy).
- ☐ 'Other qualifications': Vocational/Work-related Qualifications, Foreign Qualifications/ Qualifications gained outside the UK (NI) (Not stated/level unknown)

[*] Are you married or living with a partner? [Yes, No]

[*] Are you:
Currently Pregnant
Have you:
Given birth in the last 12 months
Or are you:
Neither of the above

*If neither of the above selected then link to a page that says "Thank you very much for taking the time to complete this survey into Maternal Wellbeing, Mental Health and Life Experiences survey. We are currently only recruiting individuals who are currently pregnant or have given birth within the last 12 months. However, you may be interested to take part in our NCMH study which is open to everyone. You can find more information about that here. *link to NCMH study.*

*FOR PARTICIPANTS WHO SELECT "YES" TO CURRENTLY PREGNANT – DROP DOWN*:

Questions about your pregnancy

(Details of pregnancy)

What is your estimated due date?

DD/MM/YYYY

How many pregnancies have you had? (Including current pregnancy if pregnant)

*IF RESPONSE = 2+ THEN*

How many have resulted in live births?

What are their ages and sex?

How many children under 18 are living in your home?

Is your current pregnancy a multiple pregnancy?

Single/Twin/Triplet/Quadruplet/Don't know

What is the sex of the baby?

Male/Female/Don't know or don't want to say

How do you intend to feed your baby in the first 6 months?

Exclusively breast/Exclusively formula/Breast and formula

These questions are about your thoughts and feelings about the developing baby. Please select one box only in answer to each question.

| | | | | | |
|---|---|---|---|---|---|
| Over the past two weeks I have thought about, or been preoccupied with the baby inside me: | Almost all the time | Very frequently | Frequently | Occasionally | Not at all |
| Over the past two weeks when I have spoken about, or thought about the baby inside me I got emotional feelings which were: | Very weak or non-existent | Fairly weak | In between strong and weak | Fairly strong | Very strong |

| | | | | | |
|---|---|---|---|---|---|
| Over the past two weeks my feelings about the baby inside me have been: | Very positive | Mainly positive | Mixed positive and negative | Mainly negative | Very negative |
| Over the past two weeks I have had the desire to read about or get information about the developing baby. This desire is: | Very weak or non-existent | Fairly weak | Neither strong nor weak | Moderately strong | Very strong |
| Over the past two weeks I have been trying to picture in my mind what the developing baby actually looks like in my womb: | Almost all the time | Very frequently | Frequently | Occasionally | Not at all |
| Over the past two weeks I think of the developing baby mostly as: | A real little person with special characteristics | A baby like any other baby | A human being | A living thing | A thing not yet really alive |
| Over the past two weeks I have felt that the baby inside me is dependent on me for its well-being: | Totally | A great deal | Moderately | Slightly | Not at all |
| Over the past two weeks I have found myself talking to my baby when I am alone: | Not at all | Occasionally | Frequently | Very frequently | Almost all the time I am alone |

| | | | | | |
|---|---|---|---|---|---|
| Over the past two weeks when I think about (or talk to) my baby inside me, my thoughts: | Are always tender and loving | Are mostly tender and loving | Are a mixture of both tenderness and irritation | Contain a fair bit of irritation | Contain a lot of irritation |
| The picture in my mind of what the baby at this stage actually looks like inside the womb is: | Very clear | Fairly clear | Fairly vague | Very vague | I have no idea at all |
| Over the past two weeks when I think about the baby inside me I get feelings which are: | Very sad | Moderately sad | A mixture of happiness and sadness | Moderately happy | Very happy |
| Some pregnant women sometimes get so irritated by the baby inside them that they feel like they want to hurt it or punish it: | I couldn't imagine I would ever feel like this | I could imagine I might sometimes feel like this, but I never actually have | I have felt like this once or twice myself | I have occasionally felt like this myself | I have often felt like this myself |
| Over the past two weeks I have felt: | Very emotionally distant from my baby | Moderately emotionally distant from my baby | Not particularly emotionally close to my baby | Moderately close emotionally to my baby | Very close emotionally to my baby |
| Over the past two weeks I have taken care with what I eat to make sure the baby gets a good diet: | Not at all | One or twice when I ate | Occasionally when I ate | Quite often when I ate | Every time I ate |
| When I first see my baby | Intense affection | Mostly affection | Dislike about one or two | Dislike about quite a few | Mostly dislike |

| | | | | | |
|---|---|---|---|---|---|
| after the birth I expect I will feel: | | | aspects of the baby | aspects of the baby | |
| When my baby is born I would like to hold the baby: | Immediately | After the baby has been wrapped in a blanket | After the baby has been washed | After a few hours for things to settle down | The next day |
| Over the past two weeks I have had dreams about the pregnancy or baby: | Not at all | Occasionally | Frequently | Very frequently | Almost every night |
| Over the past two weeks I have found myself feeling, or rubbing with my hand, the outside of my stomach where the baby is: | A lot of times each day | At least once per day | Occasionally | Once only | Not at all |
| If the pregnancy was lost at this time (due to miscarriage or other accidental event) without any pain or injury to myself, I expect I would feel: | Very pleased | Moderately pleased | Neutral (ie neither sad nor pleased; or mixed feelings) | Moderately sad | Very sad |

Thank you for answering these questions on your feelings towards your baby. It is important to be clear that we are not monitoring individual responses and will not contact you in response to the answers you have given.

A number of links to sources of support can be found here that may be helpful to you.

## Questions about your physical and mental health and wellbeing:

[*] Has a Doctor or health professional ever told you that you have any of the following physical health diagnoses?

| | Yes (currently) | Yes (in the past) | No |
|---|---|---|---|
| Asthma | | | |
| Breast Cancer | | | |
| Cancer (other) | | | |
| Morning Sickness | | | |
| Diabetes – Type 1 | | | |
| Diabetes – Type 2 | | | |
| Elevated Lipids/Cholesterol | | | |
| Epilepsy/Seizure Disorder | | | |
| Gastric or Duodenal Ulcers | | | |
| Head Injury | | | |
| Heart Disease | | | |
| Hypertension/High Blood Pressure | | | |
| Human Immunodeficiency Virus (HIV) | | | |
| Kidney Disease | | | |
| Liver Disease | | | |
| Migraine Headaches | | | |
| Meningitis | | | |
| Multiple Sclerosis | | | |
| Osteoarthritis | | | |
| Osteoporosis | | | |
| Pelvic Inflammatory Disease (PID) | | | |
| Rheumatoid Arthritis | | | |
| Stroke/Haemorrhage | | | |
| Overactive Thyroid/Hyperthyroid | | | |
| Underactive Thyroid/Hypothyroid | | | |
| Inflammatory Bowel Disease | | | |
| Gestational Diabetes | | | |
| Pre-eclampsia | | | |
| Polycystic Ovaries | | | |
| Chronic Inflammatory Conditions | | | |
| Other ☐ | | | |

Has a doctor or health professional ever told you that you have any of the following diagnoses? (Tick all that apply)

| | Current pregnancy | Previous pregnancy | Previous postpartum period (from birth to one year after childbirth) | A time in your life separate from pregnancy or the postpartum period |
|---|---|---|---|---|
| Pregnancy and childbirth related disorders | | | | |
| Postpartum (Postnatal / Puerperal) Psychosis | N/A | N/A | | N/A |
| Antenatal Depression | | | N/A | N/A |
| Postnatal Depression | N/A | N/A | | N/A |
| Tokophobia (fear of childbirth) | | | | |
| Mood related disorders | | | | |
| Depression | | | | |
| Bipolar | | | | |
| Mania/Hypomania | | | | |

| | | | | |
|---|---|---|---|---|
| Anxiety related disorders | | | | |
| Anxiety | | | | |
| Agoraphobia | | | | |
| Panic Disorder | | | | |
| Phobias | | | | |
| Post-traumatic stress disorder (PTSD) | | | | |
| Complex PTSD | | | | |
| Obsessive Compulsive Disorder (OCD) | | | | |
| Schizophrenia spectrum and other psychotic disorders | | | | |
| Psychosis | | | | |
| Schizophrenia | | | | |
| Schizoaffective Disorder | | | | |
| Personality Disorders | | | | |
| Borderline Personality Disorder | | | | |
| Other personality disorders | | | | |
| Eating disorders | | | | |
| Anorexia | | | | |
| Bulimia | | | | |
| Neurodevelopmental/Disruptive Behaviour Disorders and Learning Disabilities | | | | |
| ADHD | | | | |
| Autism | | | | |
| Asperger's/ASD | | | | |
| Conduct Disorder | | | | |
| ODD | | | | |
| Dyslexia | | | | |
| Dyspraxia | | | | |
| Intellectual Disability/Learning Disability | | | | |
| Substance related addictive disorders | | | | |
| Alcohol | | | | |
| Other substances | | | | |
| Other: | | | | |

*FOR PARTICIPANTS WHO SELECT "YES" TOGIVEN BIRTH IN THE LAST 12 MONTHS– DROP DOWN:*

Questions about your pregnancy and your baby

Questions about you new baby:

[*] What was the date of birth of your baby?

[*] What was the sex of your baby?

[*] What was the due date of your baby?

[*] What was the birth weight of your baby?

[*] Including your new baby how many children do you have?

How many other pregnancies have you had?

*IF RESPONSE = 2+ THEN*
How many have resulted in live births?
What are their ages and sex?
How many children under 18 are living in your home?

Questions about your labour and delivery:
[*] Please indicate if your received any of the following with your most recent childbirth:
(a) having your waters broken by a midwife or doctor Yes No
(b) having a drip or needle inserted into a vein in your arm or hand Yes No
(c) having your labour started off by means of a pessary or same gel inserted high into your vagina Yes No
(d) receiving syntocinon (through a drip), which is a drug used for starting labour or speeding it up Yes No
(e) having a catheter (thin tube) inserted into your bladder to drain urine Yes No
(f) having some vaginal examinations (internals) during labour Yes No
(g) having an enema/suppository (something inserted into your rectum to help you to open your bowels) Yes No
(h) having external monitoring (having a transducer on your tummy attached to a monitor which measures your contractions and prints out your baby's heartbeat) Yes No
(i) having internal monitoring (having an electrode, which is attached to a monitor, inserted through your vagina and clipped onto your baby's head) Yes No
(j) having a blood sample taken from your baby's scalp during labour Yes No
(k) having a Caesarean (an operation where the baby is delivered through a cut in your tummy) Yes No
(l) having a forceps (or ventouse/vacuum) delivery Yes No
(m) having an episiotomy (a cut to enlarge the vagina) Yes No
(n) having gas and air (entonox) for pain relief during labour Yes No
(o) using TENS (having electrode pads stuck to your back which stimulate your body's natural painkillers) Yes No
(p) having an injection of pethidine for pain relief during labour Yes No
(q) having an epidural or spinal (a drug injected into your back which numbs the lower part of your body) Yes No
(r) having a general anaesthetic (anaesthesia which makes you unconscious/asleep) Yes No
(s) having an injection of syntometrine (a drug used to speed up delivery of the placenta/afterbirth) just as your baby is born Yes No
(t) having stitches (in your vagina or the surrounding area) after the birth Yes No

[*] Please respond to the following statement with the option that best applies to your most recent childbirth experience

| Statement | 1<br>Totally Agree | 2<br>Mostly Agree | 3<br>Mostly Disagree | 4<br>Totally Disagree |
|---|---|---|---|---|
| Labour and birth went as I had expected | | | | |
| I felt strong during labour and birth | | | | |
| I felt capable during labour and birth | | | | |

| | | | | |
|---|---|---|---|---|
| I was tired during labour and birth | | | | |
| I felt happy during labour and birth | | | | |
| I felt that I handled the situation well | | | | |
| As a whole, how painful did you feel childbirth was?* | 0-100 | | | |
| As a whole, how much control did you feel you had during childbirth?* | 0-100 | | | |
| My midwife devoted enough time to me | | | | |
| My midwife devoted enough time to my partner | | | | |
| My midwife kept me informed about what was happening during labour and birth | | | | |
| My midwife understood my needs | | | | |
| I felt very well cared for by my midwife | | | | |
| I felt scared during labour and birth | | | | |
| I have many positive memories from childbirth | | | | |
| I have many negative memories from childbirth | | | | |
| Some of my memories from childbirth make me feel depressed | | | | |
| My impression of the team's medical skills made me feel secure | | | | |
| As a whole, how secure did you feel during childbirth?* | 0-100 | | | |
| I felt I could have a say whether I could be up and about or lie down | | | | |
| I felt I could have a say in deciding my birthing position | | | | |
| I felt I could have a say in the choice of pain relief | | | | |

Questions about your relationship with your baby

[*] Please indicate how often the following are true for you. There are no 'right' or 'wrong' answers. Choose the answer which seems right in your most recent childbirth experience.

| Statement | Always | Very Often | Quite Often | Sometimes | Rarely | Never |
|---|---|---|---|---|---|---|
| I feel close to my baby | 0 | 1 | 2 | 3 | 4 | 5 |
| I wish the old days when I had no baby would come back | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel distant from my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| I love to cuddle my baby | 0 | 1 | 2 | 3 | 4 | 5 |
| I regret having this baby | 5 | 4 | 3 | 2 | 1 | 0 |
| The baby does not seem to be mine | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby winds me up | 5 | 4 | 3 | 2 | 1 | 0 |
| I love my baby to bits | 0 | 1 | 2 | 3 | 4 | 5 |
| I feel happy when my baby smiles or laughs | 0 | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| My baby irritates me | 5 | 4 | 3 | 2 | 1 | 0 |
| I enjoy playing with my baby | 0 | 1 | 2 | 3 | 4 | 5 |
| My baby cries too much | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel trapped as a mother | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel angry with my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| I resent my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby is the most beautiful baby in the world | 0 | 1 | 2 | 3 | 4 | 5 |
| I wish my baby would somehow go away | 5 | 4 | 3 | 2 | 1 | 0 |
| I have done harmful things to my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby makes me feel anxious | 5 | 4 | 3 | 2 | 1 | 0 |
| I am afraid of my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby annoys me | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel confident when caring for my baby | 0 | 1 | 2 | 3 | 4 | 5 |
| I feel the only solution is for someone else to look after my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel like hurting my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby is easily comforted | 0 | 1 | 2 | 3 | 4 | 5 |

Thank you for answering these questions on your feelings towards your baby. It is important to be clear that we are not monitoring individual responses and will not contact you in response to the answers you have given.

A number of links to sources of support can be found here that may be helpful to you.

Questions about your baby's sleep:

[*] Please mark only one (most appropriate) choice, when you respond to items with a few options.

Please respond in relation to your youngest child.

| | | | | | |
|---|---|---|---|---|---|
| Sleeping arrangement: | Infant crib in a separate room | Infant crib in parents' room | In parents' bed | Infant crib in room with sibling | Other, specify: |
| In what position does your child sleep most of the time? | | | On his/her belly | On his/her side | On his her/back |
| How much time does your child spend in sleep during the NIGHT (between 7pm and 7am)? | | Hours: | | Minutes: | |
| How much time does your child spend in sleep during the DAY (between 7am and 7pm)? | | Hours: | | Minutes: | |
| Average number of night wakings per night: | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| How much time during the night does your child spend in wakefulness (from 10pm to 6am)? | | Hours: | | Minutes: | |
| How long does it take to put your baby to sleep in the evening? | | Hours: | | Minutes: | |
| How does your baby fall asleep? | While feeding | Being rocked | Being held | In bed alone | In bed near parent |
| When does your baby usually fall asleep for the night | | Hours: | | Minutes: | |
| Do you consider your child's sleep as a problem? | | | A very serious problem | A small problem | Not a problem at all |

Questions about your physical and mental health and wellbeing:
[*] Has a Doctor or health professional ever told you that you have any of the following physical health diagnoses?

| | Yes (currently) | Yes (in the past) | No |
|---|---|---|---|
| Asthma | | | |
| Breast Cancer | | | |
| Cancer (other) | | | |
| Morning Sickness | | | |
| Diabetes – Type 1 | | | |
| Diabetes – Type 2 | | | |
| Elevated Lipids/Cholesterol | | | |
| Epilepsy/Seizure Disorder | | | |
| Gastric or Duodenal Ulcers | | | |
| Head Injury | | | |
| Heart Disease | | | |
| Hypertension/High Blood Pressure | | | |
| Human Immunodeficiency Virus (HIV) | | | |
| Kidney Disease | | | |
| Liver Disease | | | |
| Migraine Headaches | | | |
| Meningitis | | | |
| Multiple Sclerosis | | | |
| Osteoarthritis | | | |
| Osteoporosis | | | |
| Pelvic Inflammatory Disease (PID) | | | |
| Rheumatoid Arthritis | | | |
| Stroke/Haemorrhage | | | |
| Overactive Thyroid/Hyperthyroid | | | |
| Underactive Thyroid/Hypothyroid | | | |
| Inflammatory Bowel Disease | | | |
| Gestational Diabetes | | | |
| Pre-eclampsia | | | |
| Polycystic Ovaries | | | |
| Chronic Inflammatory Conditions | | | |
| Other [ ] | | | |

Has a doctor or health professional ever told you that you have any of the following diagnoses? (Tick all that apply)

| | Current pregnancy or postpartum period | Previous pregnancy | Previous postpartum period (from birth to one year after childbirth) | A time in your life separate from pregnancy or the postpartum period |
|---|---|---|---|---|
| Pregnancy and childbirth related disorders | | | | |
| Postpartum (Postnatal / Puerperal) Psychosis | | N/A | | N/A |
| Antenatal Depression | | | N/A | N/A |
| Postnatal Depression | | N/A | | N/A |
| Tokophobia (fear of childbirth) | | | | |
| Mood related disorders | | | | |
| Depression | | | | |
| Bipolar | | | | |
| Mania/Hypomania | | | | |
| Anxiety related disorders | | | | |
| Anxiety | | | | |
| Agoraphobia | | | | |
| Panic Disorder | | | | |
| Phobias | | | | |
| Post-traumatic stress disorder (PTSD) | | | | |
| Complex PTSD | | | | |
| Obsessive Compulsive Disorder (OCD) | | | | |
| Schizophrenia spectrum and other psychotic disorders | | | | |
| Psychosis | | | | |
| Schizophrenia | | | | |
| Schizoaffective Disorder | | | | |
| Personality Disorders | | | | |
| Borderline Personality Disorder | | | | |
| Other personality disorders | | | | |
| Eating disorders | | | | |
| Anorexia | | | | |
| Bulimia | | | | |
| Neurodevelopmental/Disruptive Behaviour Disorders and Learning Disabilities | | | | |
| ADHD | | | | |
| Autism | | | | |
| Asperger's/ASD | | | | |
| Conduct Disorder | | | | |
| ODD | | | | |

| | | | | |
|---|---|---|---|---|
| Dyslexia | | | | |
| Dyspraxia | | | | |
| Intellectual Disability/Learning Disability | | | | |
| Substance related addictive disorders | | | | |
| Alcohol | | | | |
| Other substances | | | | |
| Other: | | | | |

*ALL PARTICIPANTS*

Questions about your mental health and wellbeing:

What intervention / treatments have you received for your mental health?

| | Current pregnancy or postpartum period | Previous pregnancy | Previous postpartum period (from birth to one year after childbirth) | A time in your life separate from pregnancy or the postpartum period |
|---|---|---|---|---|
| Medication | | | | |
| Anti-depressants | | | | |
| Mood stabilizers | | | | |
| Anti-psychotics | | | | |
| Anti-anxiety | | | | |
| Sleep tablets | | | | |
| Other | | | | |
| Treatments | | | | |
| Electro convulsive therapy (ECT) | | | | |

[*] Have you ever received any of the following psychological treatments?

| | Currently receiving | Have received in the past | Never |
|---|---|---|---|
| Cognitive Behavioural Therapy (CBT) | | | |
| Trauma-focused Cognitive Behavioural Therapy (TF-CBT) | | | |
| Exposure Response Prevention Therapy (ERP) | | | |
| Couples Therapy | | | |
| Dialectical Behaviour Therapy (DBT) | | | |
| Acceptance and Commitment Therapy (ACT) | | | |
| Cognitive Analytic Therapy (CAT) | | | |
| Eye Movement Desensitization and Reprocessing (EMDR) Therapy | | | |
| Systematic Family Therapy | | | |
| Interpersonal Psychotherapy (IPT) | | | |

| | | | |
|---|---|---|---|
| Parent-Infant Relationship Intervention (e.g., video interactive guidance, watch wait and wonder) | | | |
| Psychoanalytic Psychotherapy | | | |
| Counselling | | | |
| Self-management | | | |
| Psychoeducation | | | |

We have included questions below about self-harm and suicide but please feel free to indicate that you would prefer not to answer
Have you ever self-harmed? Yes/No/Prefer not to say
(during current pregnancy or the postpartum period) Yes/No/Prefer not to say
(during previous pregnancy or the postpartum period) Yes/No/Prefer not to say
*If "YES"/"PREFER NOT TO SAY" to either question: Pop-up link to a list of support organisations [see appendix 1]*
Have you ever attempted suicide? Yes/No/ Prefer not to say
(during current pregnancy or the postpartum period) Yes/No/ Prefer not to say
(during previous pregnancy or the postpartum period) Yes/No/ Prefer not to say

*If "YES"/"PREFER NOT TO SAY" to either question: Pop-up link to a list of support organisations [see appendix 1]*
Thank you for answering these questions on suicide and self-harm. It is important to be clear that we are not monitoring individual responses and will not contact you in response to the answers you have given.

A number of links to sources of support can be found here that may be helpful to you.

Questions about the COVID-19 crisis:

Have you displayed symptoms of COVID-19? [Yes/No]
Have you tested positive for COVID-19? [Yes/No]
Do you believe you have been in close contact with someone with COVID-19? [Yes/No]

Have you experienced any of the following as a result of the COVID-19 pandemic?

| | |
|---|---|
| Lost your job / been unable to do paid work | |
| Your spouse/partner lost their job or was unable to do paid work | |
| Unable to pay bills | |
| Evicted/lost accommodation | |
| Unable to access sufficient food | |
| Unable to access required medication | |
| Somebody close to you is in hospital with COVID-19 | |
| You lost somebody close to you with COVID-19 | |
| None of the above | |

[*] Are you worried about your mental health as a result of COVID-19? [Very worried 5-1 Not worried at all]
[*] Are you worried about your physical health as a result of COVID-19? [Very worried 5-1 Not worried at all]

[*] Are you worried about your personal finances as a result of COVID-19? [Very worried 5-1 Not worried at all]
[*] How often do you think about COVID-19? [Very often 5-1 Not at all]
[*] Have you experienced distress in response to the COVID-19 restrictions placed on your health care appointments (e.g. restrictions on birth partners or family members attending appointments with you?) [A lot of distress 5-1 No distress]

[*] Have you had difficulties accessing the following services during the COVID-19 pandemic?

| | *Not applicable / I don't think this would help me* | *I have been able to access this help* | *I have had difficulties accessing this help* |
|---|---|---|---|
| Visiting your GP | | | |
| Antenatal scans | | | |
| Midwife visits | | | |
| Vaccine appointments for your baby | | | |
| Perinatal mental health services | | | |
| Health visiting | | | |
| Family support services (e.g. flying start, family nurse partnership) | | | |
| Having a birthing partner and/or family member present at appointments | | | |

During the current pregnancy/postnatal period, have you received assessment and/or treatment from a perinatal mental health service (e.g. spoken to a mental health nurse/ psychiatrist/psychologist)
a. Yes, assessed and discharged
b. Yes assessed and provided treatment e.g. medication, psychological therapy, psychosocial support
c. No
During the current pregnancy/postnatal period, have you received mental health assessment and/or treatment from:
-NHS primary care mental health service (e.g. GP referred you to a counsellor or another mental health professional) Yes/No
-Third sector (e.g. charities like MIND, NSPCC) Yes/No
-Private provider? Yes/No

[*] Do you feel fully supported by the health system throughout pregnancy?
1 (Not supported at all) 2 3 4 5 (Fully supported)

[*] Indicate for each of the statements below the degree to which this change occurred in your life as a result of the COVID-19 outbreak, using the following scale.

0 = I did not experience this change as a result of this crisis.
1 = I experienced this change to a very small degree as a result of this crisis.
2 = I experienced this change to a small degree as a result of this crisis.
3 = I experienced this change to a moderate degree as a result of this crisis.
4 = I experienced this change to a great degree as a result of this crisis.
5 = I experienced this change to a very great degree as a result of this crisis.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. I changed my priorities about what is important in life. | 0 | 1 | 2 | 3 | 4 | 5 |
| 2. I have a greater appreciation for the value of my own life. | 0 | 1 | 2 | 3 | 4 | 5 |
| 3. I am able to do better things with my life. (II-11) | 0 | 1 | 2 | 3 | 4 | 5 |
| 4. I have a better understanding of spiritual matters. (IV-5) | 0 | 1 | 2 | 3 | 4 | 5 |
| 5. I have a greater sense of closeness with others. (I-8) | 0 | 1 | 2 | 3 | 4 | 5 |
| 6. I established a new path for my life. (II-7) | 0 | 1 | 2 | 3 | 4 | 5 |
| 7. I know better that I can handle difficulties. (III-10) | 0 | 1 | 2 | 3 | 4 | 5 |
| 8. I have a stronger religious faith. (IV-18) | 0 | 1 | 2 | 3 | 4 | 5 |
| 9. I discovered that I'm stronger than I thought I was. (III-19) | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. I learned a great deal about how wonderful people are. (I-20) | 0 | 1 | 2 | 3 | 4 | 5 |

Questions about your life experiences
While you were growing up, during your first 18 years of life:
Did a parent or other adult in the household often or very often… Swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hurt? Yes No
Did a parent or other adult in the household often or very often… Push, grab, slap, or throw something at you? or Ever hit you so hard that you had marks or were injured? Yes No
Did an adult or person at least 5 years older than you ever… Touch or fondle you or have you touch their body in a sexual way? or Attempt or actually have oral, anal, or vaginal intercourse with you? Yes No
Did you often or very often feel that … No one in your family loved you or thought you were important or special? or Your family didn't look out for each other, feel close to each other, or support each other? Yes No
Did you often or very often feel that … You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? or Your parents were too drunk or high to take care of you or take you to the doctor if you needed it? Yes No
Was your mother or stepmother: Often or very often pushed, grabbed, slapped, or had something thrown at her? or Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard? or Ever repeatedly hit at least a few minutes or threatened with a gun or knife? Yes No
Were your parents ever separated or divorced? Yes No

Did you live with anyone who was a problem drinker or alcoholic or who used street drugs? Yes No
Was a household member depressed or mentally ill, or did a household member attempt suicide? Yes No
Did a household member go to prison? Yes No

Please identify the life experience that troubles you most and answer the questions in relation to this experience.

Age this experience started?

Brief description of the experience:

_____

When did the experience occur?
less than 6 months ago
6 to 12 months ago
1 to 5 years ago
5 to 10 years ago
10 to 20 years ago
more than 20 years ago
[*] Below are a number of problems that people sometimes report in response to traumatic or stressful life events. Please read each item carefully, then select the options to the right to indicate how much you have been bothered by that problem in the past month in relation to the worst traumatic event that has happened to you.

| | *Not at all* | *A little bit* | *Moderately* | *Quite a bit* | *Extremely* |
|---|---|---|---|---|---|
| P1. Having upsetting dreams that replay part of the experience or are clearly related to the experience? | 0 | 1 | 2 | 3 | 4 |
| P2. Having powerful images or memories that sometimes come into your mind in which you feel the experience is happening again in the here and now? | 0 | 1 | 2 | 3 | 4 |
| P3. Avoiding internal reminders of the experience (for example, thoughts, feelings, or physical sensations)? | 0 | 1 | 2 | 3 | 4 |
| P4. Avoiding external reminders of the experience (for example, people, places, conversations, objects, activities, or situations)? | 0 | 1 | 2 | 3 | 4 |
| P5. Being “super-alert”, watchful, or on guard? | 0 | 1 | 2 | 3 | 4 |
| P6. Feeling jumpy or easily startled? | 0 | 1 | 2 | 3 | 4 |

*In the past month have the above problems:*

| | | | | | |
|---|---|---|---|---|---|
| P7. Affected your relationships or social life? | 0 | 1 | 2 | 3 | 4 |
| P8. Affected your work or ability to work? | 0 | 1 | 2 | 3 | 4 |
| P9. Affected any other important part of your life such as parenting, or school or college work, or other important activities? | 0 | 1 | 2 | 3 | 4 |

Below are problems that people who have had stressful or traumatic events sometimes experience. The questions refer to ways you typically feel, ways you typically think about yourself and ways you typically relate to others. Answer the following thinking about how true each statement is of you.

| *How true is this of you?* | *Not at all* | *A little bit* | *Moderately* | *Quit a bit* | *Extremely* |
|---|---|---|---|---|---|
| C1. When I am upset, it takes me a long time to calm down. | 0 | 1 | 2 | 3 | 4 |
| C2. I feel numb or emotionally shut down. | 0 | 1 | 2 | 3 | 4 |
| C3. I feel like a failure. | 0 | 1 | 2 | 3 | 4 |
| C4. I feel worthless. | 0 | 1 | 2 | 3 | 4 |
| C5. I feel distant or cut off from people. | 0 | 1 | 2 | 3 | 4 |
| C6. I find it hard to stay emotionally close to people. | 0 | 1 | 2 | 3 | 4 |
| *In the past month, have the above problems in emotions, in beliefs about yourself and in relationships:* | | | | | |
| C7. Created concern or distress about your relationships or social life? | 0 | 1 | 2 | 3 | 4 |
| C8. Affected your work or ability to work? | 0 | 1 | 2 | 3 | 4 |
| C9. Affected any other important parts of your life such as parenting, or school or college work, or other important activities? | 0 | 1 | 2 | 3 | 4 |

*If answering any of these questions have caused you distress, then you can find some support here.*

Questions about the support you receive:

We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Select the “1” if you Very Strongly Disagree - Select the “2” if you Strongly Disagree - Select the “3” if you Mildly Disagree - Select the “4” if you are Neutral – Select the “5” if you Mildly Agree - Select the “6” if you Strongly Agree - Select the “7” if you Very Strongly Agree

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. There is a special person who is around when I am in need. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2. There is a special person with whom I can share my joys and sorrows. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. My family really tries to help me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I get the emotional help and support I need from my family. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. I have a special person who is a real source of comfort to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. My friends really try to help me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. I can count on my friends when things go wrong. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. I can talk about my problems with my family. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. I have friends with whom I can share my joys and sorrows. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. There is a special person in my life who cares about my feelings. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. My family is willing to help me make decisions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. I can talk about my problems with my friends. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Questions about your current mental health and wellbeing:
[*] Over the last 2 weeks, how often have you been bothered by any of the following problems?

| | Not at all | Several days | More than half the days | Nearly every day |
|---|---|---|---|---|
| 1. Little interest or pleasure in doing things | 0 | 1 | 2 | 3 |
| 2. Feeling down, depressed, or hopeless | 0 | 1 | 2 | 3 |
| 3. Trouble falling or staying asleep, or sleeping too much | 0 | 1 | 2 | 3 |
| 4. Feeling tired or having little energy | 0 | 1 | 2 | 3 |
| 5. Poor appetite or overeating | 0 | 1 | 2 | 3 |
| 6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down | 0 | 1 | 2 | 3 |
| 7. Trouble concentrating on things, such as reading the newspaper or watching television | 0 | 1 | 2 | 3 |
| 8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual | 0 | 1 | 2 | 3 |

| | | | | |
|---|---|---|---|---|
| 9. Thoughts that you would be better off dead or of hurting yourself in some way | 0 | 1 | 2 | 3 |

[*] Over the last 2 weeks, how often have you been bothered by any of the following problems?

| | | | | |
|---|---|---|---|---|
| Feeling nervous, anxious or on edge? | Not at all | Several days | More than half the days | Nearly every day |
| Not being able to stop or control worrying? | Not at all | Several days | More than half the days | Nearly every day |
| Worrying too much about different things? | Not at all | Several days | More than half the days | Nearly every day |
| Trouble relaxing? | Not at all | Several days | More than half the days | Nearly every day |
| Being so restless that it is hard to sit still? | Not at all | Several days | More than half the days | Nearly every day |
| Becoming easily annoyed or irritable? | Not at all | Several days | More than half the days | Nearly every day |
| Feeling afraid as if something awful might happen? | Not at all | Several days | More than half the days | Nearly every day |

“Thank you for taking part in the research. Without people generously giving their time to share their experiences, we wouldn’t be able to do the important work we are doing to improve understanding of the impact life experiences on maternal mental health problems. We will keep in touch with you via our newsletter and contact you up to 1 year postpartum to invite you to provide more information. We will also let you know of any additional research opportunities that may be of interest to you. There will be no obligation for you to take part in these future opportunities.”

Participant lands on a page providing details of organisations that can provide support (appendix 1)

6. Follow-up

In line with the consent obtained, all participants will be asked to complete the follow up within 2 week after initial recruitment into the study. Prenatal recruited participants will be followed up again in the first year after childbirth, 1 month postpartum and 6 months postpartum. Postnatal recruits will be further followed up in 6 months’ time. Participants will be invited to take part in follow-up surveys via email. Each email will include a unique survey link that will pre-populate the participant’s ID number thus allowing us to link their new data with the existing data previously collected.

One Week Follow up

Text:

“Many thanks for taking part in the National Centre for Mental Health (NCMH) Maternal Wellbeing, Mental Health and Life Experiences survey. We appreciate you taking the time to fill out the questions last time. We ask people who are willing to take part, if they would be kind enough to complete the first follow-up survey answering some more questions about their wellbeing, mental health and life experiences. Some of these are new questions, and some are questions you answered before.
These questions today should take roughly 15-25 minutes to complete. Please remember to click ‘Submit’ even if you haven’t completed all of the questions. We would like to ask you these questions to get a better understanding of the person you are, and the relationships you hold.
If you have any questions or would like further information, please contact us on (PHONE NUMBER) or (EMAIL ADDRESS).
Once again, thank you very much for helping with our research. Together we can make a difference for maternal wellbeing and mental health.”

*ALL PARTICIPANTS*
Questions about your emotions:

**Please indicate how often the following apply to you.**

| | Almost Never (0–10%) | Some-times (11–35%) | About Half Of the Time (36–65%) | Most of the Time (66–90%) | Almos Alway (91–100 |
|---|---|---|---|---|---|
| 1. I pay attention to how I feel | 1 | 2 | 3 | 4 | 5 |
| 2. I have no idea how I am feeling | 1 | 2 | 3 | 4 | 5 |
| 3. I have difficulty making sense out of my feelings | 1 | 2 | 3 | 4 | 5 |
| 4. I care about what I am feeling | 1 | 2 | 3 | 4 | 5 |
| 5. I am confused about how I feel | 1 | 2 | 3 | 4 | 5 |
| 6. When I'm upset, I acknowledge my emotions | 1 | 2 | 3 | 4 | 5 |
| 7. When I'm upset, I become embarrassed for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 8. When I'm upset, I have difficulty getting work done | 1 | 2 | 3 | 4 | 5 |
| 9. When I'm upset, I become out of control | 1 | 2 | 3 | 4 | 5 |
| 10. When I'm upset, I believe that I will end up feeling very depressed | 1 | 2 | 3 | 4 | 5 |
| 11. When I'm upset, I have difficulty focusing on other things | 1 | 2 | 3 | 4 | 5 |
| 12. When I'm upset, I feel guilty for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 13. When I'm upset, I have difficulty concentrating | 1 | 2 | 3 | 4 | 5 |
| 14. When I'm upset, I have difficulty controlling my behaviors | 1 | 2 | 3 | 4 | 5 |
| 15. When I'm upset, I believe there is nothing I can do to make myself feel better | 1 | 2 | 3 | 4 | 5 |
| 16. When I'm upset, I become irritated with myself for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 17. When I'm upset, I lose control over my behavior | 1 | 2 | 3 | 4 | 5 |
| 18. When I'm upset, it takes me a long time to feel better | 1 | 2 | 3 | 4 | 5 |

Questions about your relationships:
The following statements concern how you feel in romantic relationships. We are interested in how you generally experience relationships, not just what is happening in a current or recent relationship. Respond to each statement by ticking the box which indicates how much you agree or disagree with it.

| | Strongly disagree | Disagree | Slightly disagree | Neutral | Slightly agree | Agree | Strongly agree |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| It helps to turn to my romantic partner in times of need | | | | | | | |
| I need a lot of reassurance that I am loved by my partner | | | | | | | |
| I want to get close to my partner, but I keep pulling back | | | | | | | |
| I find that my partner(s) don't want to get as close as I would like | | | | | | | |
| I turn to my partner for many things, including comfort and reassurance | | | | | | | |
| My desire to be very close sometimes scares people away | | | | | | | |
| I try to avoid getting too close to my partner | | | | | | | |
| I do not often worry about being abandoned | | | | | | | |
| I usually discuss my problems and concerns with my partner | | | | | | | |
| I get frustrated if romantic partners are not available when I need them | | | | | | | |
| I am nervous when partners get too close to me | | | | | | | |
| I worry that romantic partners won't care about me as much as I care about them | | | | | | | |

Questions about feelings in certain situations
[*] Please read each statement carefully before answering. To the right of each item, indicate how often you behave in the stated manner:

| | Almost Never | | | | Almost Always |
|---|---|---|---|---|---|
| 1. When I fail at something important to me I become consumed by feelings of inadequacy | 1 | 2 | 3 | 4 | 5 |
| 2. I try to be understanding and patient towards those aspects of my personality I don't like | 1 | 2 | 3 | 4 | 5 |
| 3. When something painful happens I try to take a balanced view of the situation | 1 | 2 | 3 | 4 | 5 |
| 4. When I'm feeling down, I tend to feel like most other people are probably happier that I am. | 1 | 2 | 3 | 4 | 5 |
| 5. I try to see my failings as part of the human condition. | 1 | 2 | 3 | 4 | 5 |
| 6. When I'm going through a very hard time, I give myself the caring and tenderness I need. | 1 | 2 | 3 | 4 | 5 |
| 7. When something upsets me I try to keep my emotions in balance. | 1 | 2 | 3 | 4 | 5 |
| 8.When I fail at something that's important to me, I tend to feel alone in my failure. . | 1 | 2 | 3 | 4 | 5 |
| 9. When I'm feeling down, I tend to obsess and fixate on everything that's wrong. | 1 | 2 | 3 | 4 | 5 |
| 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people. | 1 | 2 | 3 | 4 | 5 |
| 11. I'm disapproving and judgemental about my own flaws and inadequacies. | 1 | 2 | 3 | 4 | 5 |
| 12. I'm intolerant and impatient towards those aspects of my personality I don't like. | 1 | 2 | 3 | 4 | 5 |

[*] For each item. Please mark a tick in the box below that best indicates how much you agree with the following statements as they apply to you over the last month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

| | Not at all true | Rarely true | Sometimes true | Often true | True nearly all the time |
|---|---|---|---|---|---|
| I am able to adapt to when changes occur | | | | | |
| I can deal with whatever comes my way | | | | | |
| I try to see the humorous side of things when I am faced with problems | | | | | |
| Having to cope with stress can make me stronger | | | | | |
| I tend to bounce back after illness, injury, or other hardship | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| I believe I can achieve my goals, even if there are obstacles | | | | | |
| Under pressure, I stay focused and think clearly | | | | | |
| I am not easily discouraged by failure | | | | | |
| I think of myself as a strong person when dealing with life's challenges and difficulties | | | | | |
| I am able to handle unpleasant or painful feelings like sadness, fear, and anger | | | | | |

Questions about your life experiences
[*] Below, you will see a list of difficult or stressful things that sometimes happen to people. For each event, please state whether it happened in childhood and/or adulthood by selecting 'yes', 'no' or 'not sure'. And in the last month?
*You do not need to answer any of these questions if doing so would be distressing. Please visit the NCMH website [link – see appendix 1] for information on organisations that you can call if you need some support."*

1. Natural disaster (for example, flood, hurricane, tornado, earthquake)
A "Happened in childhood (before age of 18)" [Yes, No, Not sure]
B "Happened in adulthood (at or after age of 18)" [Yes, No, Not sure]

2. Fire or explosion
A "Happened in childhood (before age of 18)" [Yes, No, Not sure]
B "Happened in adulthood (at or after age of 18)" [Yes, No, Not sure]

3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash)
A "Happened in childhood (before age of 18)" [Yes, No, Not sure]
B "Happened in adulthood (at or after age of 18)" [Yes, No, Not sure]

4. Serious accident at work, home, or during recreational activity
A "Happened in childhood (before age of 18)" [Yes, No, Not sure]
B "Happened in adulthood (at or after age of 18)" [Yes, No, Not sure]

5. Exposure to toxic substance (for example, dangerous chemicals, radiation)
A "Happened in childhood (before age of 18)" [Yes, No, Not sure]
B "Happened in adulthood (at or after age of 18)" [Yes, No, Not sure]

6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up) <u>NOT by parent or caregiver</u>
A "Happened in childhood (before age of 18)" [Yes, No, Not sure]
B "Happened in adulthood (at or after age of 18)" [Yes, No, Not sure]

7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb) <u>NOT by parent or caregiver</u>

A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm) NOT by parent or caregiver
A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

9. Other unwanted or uncomfortable sexual experience
A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

10. Combat or exposure to a war-zone (in the military or as a civilian)
A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

11. Captivity (for example being kidnapped, abducted, held hostage, prisoner of war)
A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

12. Life-threatening illness or injury
A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

13. Severe human suffering
A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

14. Witnessed a violent death (for example, homicide; suicide)
A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

15. Experienced a sudden, unexpected death of someone close to you
A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

16. Serious injury, harm or death you caused to someone else
A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

17. Any other very stressful event or experience

A “Happened in childhood (before age of 18)” [Yes, No, Not sure]
B “Happened in adulthood (at or after age of 18)” [Yes, No, Not sure]

Questions about your feelings and behaviours:

Instructions: Below are several statements about the way you may feel or behave. Please answer each question in the way that best describes you on a 1 to 5 point scale, where 1 = strongly disagree with the statement, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree with the statement. Please read each item carefully and provide your answer that best corresponds to your agreement or disagreement. There are no right or wrong answers. Describe yourself honestly and state your opinions as accurately as possible.

1. I am emotionally unstable.
2. I often feel so ashamed.
3. I have trouble taking the perspective of others.
4. I harm myself when I'm upset.
5. I have dramatic shifts in my feelings.
6. My identity changes a lot.
7. My relationships tend to be very unstable.
8. I have no real self-control over what I do.
9. I get angry a lot.
10. I wish I were someone else.
11. Being abandoned is one of my greatest fears.
12. People say I deal with my feelings poorly.

"Thank you for taking part in the research. Without people generously giving their time to share their experiences, we wouldn't be able to do the important work we are doing to improve understanding of the impact life experiences on maternal mental health problems. We will keep in touch with you via our newsletter and contact you up to 1 year postpartum to invite you to provide more information. We will also let you know of any additional research opportunities that may be of interest to you. There will be no obligation for you to take part in these future opportunities.

On the following page are a list of support services that may be useful to you."

Participant lands on a page providing details of organisations that can provide support (appendix 1)

One Month Postpartum Follow up (Prenatal recruits only)

Text:

"Many thanks for taking part in the National Centre for Mental Health (NCMH) Maternal Wellbeing, Mental Health and Life Experiences survey. We appreciate you taking the time to fill out the questions last time. We ask people who are willing to take part, if they would be kind enough to complete the next follow-up survey answering some more questions about their wellbeing, recent pregnancy, mental health, their life experiences, and thoughts and feelings related to COVID-19. Some of these are new questions, and some are questions you answered before.

These questions today should take roughly 30 minutes to complete. Please remember to click 'Submit' even if you haven't completed all of the questions.

If you have any questions or would like further information, please contact us on (PHONE NUMBER) or (EMAIL ADDRESS).

Once again, thank you very much for helping with our research. Together we can make a difference for maternal wellbeing and mental health."

*ALL PRENATAL RECRUITS*

Questions about the birth of your baby

Was your baby born healthy? Yes/No

*If Yes carry on to further questions in relation to recent childbirth*
*If No:*

Was your baby: Born with health complications/Stillborn/Lost prior to the birth
INCLUDE ANOTHER LINK TO THE SERVICES THAT CAN SUPPORT. *If Born with complications – give the option to continue with the survey or to end involvement here. If baby lost then direct towards support services and make aware of general NCMH survey that they could complete if and when they feel comfortable to do so.*

In relation to the recent birth of your baby:
[*] What was the date of birth of your baby?
[*] What was the due date of your baby?
[*] What was the birth weight of your baby?
[*] What was the sex of your baby?
[*] How do you intend to feed your baby in the first 6 months?
Exclusively breast/Exclusively formula/Breast and formula

[*] Please indicate if your received any of the following during the birth of your baby:
(a) having your waters broken by a midwife or doctor Yes No
(b) having a drip or needle inserted into a vein in your arm or hand Yes No
(c) having your labour started off by means of a pessary or same gel inserted high into your vagina Yes No
(d) receiving syntocinon (through a drip), which is a drug used for starting labour or speeding it up Yes No
(e) having a catheter (thin tube) inserted into your bladder to drain urine Yes No
(f) having some vaginal examinations (internals) during labour Yes No
(g) having an enema/suppository (something inserted into your rectum to help you to open your bowels) Yes No
(h) having external monitoring (having a transducer on your tummy attached to a monitor which measures your contractions and prints out your baby's heartbeat) Yes No
(i) having internal monitoring (having an electrode, which is attached to a monitor, inserted through your vagina and clipped onto your baby's head) Yes No
(j) having a blood sample taken from your baby's scalp during labour Yes No
(k) having a Caesarean (an operation where the baby is delivered through a cut in your tummy) Yes No
(l) having a forceps (or ventouse/vacuum) delivery Yes No
(m) having an episiotomy (a cut to enlarge the vagina) Yes No
(n) having gas and air (entonox) for pain relief during labour Yes No
(o) using TENS (having electrode pads stuck to your back which stimulate your body's natural painkillers) Yes No
(p) having an injection of pethidine for pain relief during labour Yes No
(q) having an epidural or spinal (a drug injected into your back which numbs the lower part of your body) Yes No
(r) having a general anaesthetic (anaesthesia which makes you unconscious/asleep) Yes No
(s) having an injection of syntometrine (a drug used to speed up delivery of the placenta/afterbirth) just as your baby is born Yes No
(t) having stitches (in your vagina or the surrounding area) after the birth Yes No

[*] Please respond to the following statement with the option that best applies to your most recent childbirth experience

| Statement | 1 Totally Agree | 2 Mostly Agree | 3 Mostly Disagree | 4 Totally Disagree |
|---|---|---|---|---|
| Labour and birth went as I had expected | | | | |
| I felt strong during labour and birth | | | | |
| I felt capable during labour and birth | | | | |
| I was tired during labour and birth | | | | |
| I felt happy during labour and birth | | | | |
| I felt that I handled the situation well | | | | |
| As a whole, how painful did you feel childbirth was?* | 0-100 | | | |
| As a whole, how much control did you feel you had during childbirth?* | 0-100 | | | |
| My midwife devoted enough time to me | | | | |
| My midwife devoted enough time to my partner | | | | |
| My midwife kept me informed about what was happening during labour and birth | | | | |
| My midwife understood my needs | | | | |
| I felt very well cared for by my midwife | | | | |
| I felt scared during labour and birth | | | | |
| I have many positive memories from childbirth | | | | |
| I have many negative memories from childbirth | | | | |
| Some of my memories from childbirth make me feel depressed | | | | |
| My impression of the team's medical skills made me feel secure | | | | |
| As a whole, how secure did you feel during childbirth?* | 0-100 | | | |
| I felt I could have a say whether I could be up and about or lie down | | | | |
| I felt I could have a say in deciding my birthing position | | | | |
| I felt I could have a say in the choice of pain relief | | | | |

Questions about the relationship with your baby

[*] Please indicate how often the following are true for you. There are no 'right' or 'wrong' answers. Choose the answer which seems right in your recent experience.

| Statement | Always | Very Often | Quite Often | Sometimes | Rarely | Never |
|---|---|---|---|---|---|---|
| I feel close to my baby | 0 | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| I wish the old days when I had no baby would come back | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel distant from my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| I love to cuddle my baby | 0 | 1 | 2 | 3 | 4 | 5 |
| I regret having this baby | 5 | 4 | 3 | 2 | 1 | 0 |
| The baby does not seem to be mine | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby winds me up | 5 | 4 | 3 | 2 | 1 | 0 |
| I love my baby to bits | 0 | 1 | 2 | 3 | 4 | 5 |
| I feel happy when my baby smiles or laughs | 0 | 1 | 2 | 3 | 4 | 5 |
| My baby irritates me | 5 | 4 | 3 | 2 | 1 | 0 |
| I enjoy playing with my baby | 0 | 1 | 2 | 3 | 4 | 5 |
| My baby cries too much | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel trapped as a mother | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel angry with my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| I resent my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby is the most beautiful baby in the world | 0 | 1 | 2 | 3 | 4 | 5 |
| I wish my baby would somehow go away | 5 | 4 | 3 | 2 | 1 | 0 |
| I have done harmful things to my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby makes me feel anxious | 5 | 4 | 3 | 2 | 1 | 0 |
| I am afraid of my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby annoys me | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel confident when caring for my baby | 0 | 1 | 2 | 3 | 4 | 5 |
| I feel the only solution is for someone else to look after my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| I feel like hurting my baby | 5 | 4 | 3 | 2 | 1 | 0 |
| My baby is easily comforted | 0 | 1 | 2 | 3 | 4 | 5 |

Questions about your baby's sleep

[*] Please mark only one (most appropriate) choice, when you respond to items with a few options.

Answer in relation to your new baby.

| Sleeping arrangement: | Infant crib in a separate room | Infant crib in parents' room | In parents' bed | Infant crib in room with sibling | Other, specify: |
|---|---|---|---|---|---|
| In what position does your child sleep most of the time? | | | On his/her belly | On his/her side | On his her/back |

| | | | | | |
|---|---|---|---|---|---|
| How much time does your child spend in sleep during the NIGHT (between 7pm and 7am)? | | Hours: | | Minutes: | |
| How much time does your child spend in sleep during the DAY (between 7am and 7pm)? | | Hours: | | Minutes: | |
| Average number of night wakings per night: | | | | | |
| How much time during the night does your child spend in wakefulness (from 10pm to 6am)? | | Hours: | | Minutes: | |
| How long does it take to put your baby to sleep in the evening? | | Hours: | | Minutes: | |
| How does your baby fall asleep? | While feeding | Being rocked | Being held | In bed alone | In bed near parent |
| When does your baby usually fall asleep for the night | | Hours: | | Minutes: | |
| Do you consider your child's sleep as a problem? | | | A very serious problem | A small problem | Not a problem at all |

Questions about the COVID-19 crisis:

Have you displayed symptoms of COVID-19? [Yes/No]
Have you tested positive for COVID-19? [Yes/No]
Do you believe you have been in close contact with someone with COVID-19? [Yes/No]

Have you experienced any of the following as a result of the COVID-19 pandemic?

| | |
|---|---|
| Lost your job / been unable to do paid work | |
| Your spouse/partner lost their job or was unable to do paid work | |
| Unable to pay bills | |
| Evicted/lost accommodation | |
| Unable to access sufficient food | |
| Unable to access required medication | |
| Somebody close to you is in hospital with COVID-19 | |
| You lost somebody close to you with COVID-19 | |
| None of the above | |

[*] Are you worried about your mental health as a result of COVID-19? [Very worried 5-1 Not worried at all]
[*] Are you worried about your physical health as a result of COVID-19? [Very worried 5-1 Not worried at all]
[*] Are you worried about your personal finances as a result of COVID-19? [Very worried 5-1 Not worried at all]
[*] How often do you think about COVID-19? [Very often 5-1 Not at all]
[*] Have you experienced distress in response to the COVID-19 restrictions placed on your health care appointments (e.g. restrictions on birth partners or family members attending appointments with you?) [A lot of distress 5-1 No distress]

[*] Have you had difficulties accessing the following services during the COVID-19 pandemic?

| | *Not applicable / I don't think this would help me* | *I have been able to access this help* | *I have had difficulties accessing this help* |
|---|---|---|---|
| Visiting your GP | | | |
| Antenatal scans | | | |
| Midwife visits | | | |
| Vaccine appointments for your baby | | | |
| Perinatal mental health services | | | |
| Health visiting | | | |
| Family support services (e.g. flying start, family nurse partnership) | | | |
| Having a birthing partner and/or family member present at appointments | | | |

During the current pregnancy/postnatal period, have you received assessment and/or treatment from a perinatal mental health service (e.g. spoken to a mental health nurse/ psychiatrist/psychologist)
a. Yes, assessed and discharged
b. Yes assessed and provided treatment e.g. medication, psychological therapy, psychosocial support
c. No
During the current pregnancy/postnatal period, have you received mental health assessment and/or treatment from:
-NHS primary care mental health service (e.g. GP referred you to a counsellor or another mental health professional) Yes/No
-Third sector (e.g. charities like MIND, NSPCC) Yes/No
-Private provider? Yes/No

[*] Do you feel fully supported by the health system throughout pregnancy?
1 (Not supported at all) 2 3 4 5 (Fully supported)

[*] Indicate for each of the statements below the degree to which this change occurred in your life as a result of the COVID-19 outbreak, using the following scale.

0 = I did not experience this change as a result of my crisis.
1 = I experienced this change to a very small degree as a result of this crisis.
2 = I experienced this change to a small degree as a result of this crisis.

3 = I experienced this change to a moderate degree as a result of this crisis.
4 = I experienced this change to a great degree as a result of this crisis.
5 = I experienced this change to a very great degree as a result of this crisis.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. I changed my priorities about what is important in life. | 0 | 1 | 2 | 3 | 4 | 5 |
| 2. I have a greater appreciation for the value of my own life. | 0 | 1 | 2 | 3 | 4 | 5 |
| 3. I am able to do better things with my life. (II-11) | 0 | 1 | 2 | 3 | 4 | 5 |
| 4. I have a better understanding of spiritual matters. (IV-5) | 0 | 1 | 2 | 3 | 4 | 5 |
| 5. I have a greater sense of closeness with others. (I-8) | 0 | 1 | 2 | 3 | 4 | 5 |
| 6. I established a new path for my life. (II-7) | 0 | 1 | 2 | 3 | 4 | 5 |
| 7. I know better that I can handle difficulties. (III-10) | 0 | 1 | 2 | 3 | 4 | 5 |
| 8. I have a stronger religious faith. (IV-18) | 0 | 1 | 2 | 3 | 4 | 5 |
| 9. I discovered that I'm stronger than I thought I was. (III-19) | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. I learned a great deal about how wonderful people are. (I-20) | 0 | 1 | 2 | 3 | 4 | 5 |

*As well as measuring the effect of COVID, we would like to ask you about your experience during the birth of your most recent baby. We will ask about potential traumatic events during (or immediately after) the labour and birth, and whether you are experiencing symptoms that are reported by some women after birth. Please tick the responses closest to your experience.*

[*] During the labour, birth and immediately afterwards:
- Did you believe you or your baby would be seriously injured? YES/NO
- Did you believe you or your baby would die? YES/NO

The next questions ask about symptoms you might have experienced. Please indicate how often you have experienced the following symptoms in the last week:

| Symptoms about the birth* | Not at all | Once | 2-4 times | 5 or more times |
|---|---|---|---|---|
| Recurrent unwanted memories of the birth (or parts of the birth) that you can't control | | | | |
| Bad dreams or nightmares about the birth (or related to the birth) | | | | |
| Flashbacks to the birth and/or reliving the experience | | | | |
| Getting upset when reminded of the birth | | | | |
| Felling tense or anxious when reminded of the birth | | | | |
| Trying to avoid thinking about the birth | | | | |
| Trying to avoid things that remind me of the birth (e.g., people, places, TV programs) | | | | |
| Not able to remember details of the birth | | | | |
| Blaming myself or others for what happened during the birth | | | | |
| Feeling strong negative emotions about the birth (e.g., fear, anger, shame) | | | | |

* Although these questions refer to the birth, many women have symptoms about events that happened just before or after birth. If this is the case for you, and the events were related to pregnancy, birth or the baby then please answer for these events

| Symptoms that began or got worse since the birth | Not at all | Once | 2-4 times | 5 or more times |
|---|---|---|---|---|
| Feeling negative about myself or thinking something awful will happen | | | | |
| Lost interest in activities that were important to me | | | | |
| Feeling detached from other people | | | | |
| Not able to feel positive emotions (e.g., happy, excited) | | | | |
| Feeling irritable or aggressive | | | | |
| Feeling self-destructive or acting recklessly | | | | |
| Feeling tense and on edge | | | | |
| Feeling jumpy or easily started | | | | |
| Problems concentrating | | | | |
| Not sleeping well because of things that are not due to the baby's sleep pattern | | | | |
| Feeling detached or as if you are in a dream | | | | |
| Feeling things are distorted or not real | | | | |

[*] If you have any of these symptoms:
When did these symptoms start? Before the birth/In the first 6 months after birth/More than 6 months after birth/ Not applicable (I have no symptoms)
How long have these symptoms lasted? Less than 1 month/1 to 3 months/3 or months or more/Not applicable (I have no symptoms)
Do these symptoms cause you a lot of distress? Yes/No/Sometimes
Do they prevent you doing things you usually do (e.g., socialising, daily activities)? Yes/No/Sometimes
Could any of these symptoms be due to medication, alcohol, drugs, or physical illness? Yes/No/Maybe
Please identify the life experience that troubles you most and answer the questions in relation to this experience (this may include experiences relating to COVID-19, to the birth that you have just discussed, or to something different).

Age this experience started?

Brief description of the experience:

_____

When did the experience occur?
less than 6 months ago
6 to 12 months ago
1 to 5 years ago
5 to 10 years ago
10 to 20 years ago
more than 20 years ago
[*] Below are a number of problems that people sometimes report in response to traumatic or stressful life events. Please read each item carefully, then select the options to the right to indicate how much you have been bothered by that problem in the past month in relation to the worst traumatic event that has happened to you.

| | *Not at all* | *A little bit* | *Moderately* | *Quite a bit* | *Extremely* |
|---|---|---|---|---|---|
| P1. Having upsetting dreams that replay part of the experience or are clearly related to the experience? | 0 | 1 | 2 | 3 | 4 |
| P2. Having powerful images or memories that sometimes come into your mind in which you feel the experience is happening again in the here and now? | 0 | 1 | 2 | 3 | 4 |
| P3. Avoiding internal reminders of the experience (for example, thoughts, feelings, or physical sensations)? | 0 | 1 | 2 | 3 | 4 |
| P4. Avoiding external reminders of the experience (for example, people, places, conversations, objects, activities, or situations)? | 0 | 1 | 2 | 3 | 4 |
| P5. Being “super-alert”, watchful, or on guard? | 0 | 1 | 2 | 3 | 4 |
| P6. Feeling jumpy or easily startled? | 0 | 1 | 2 | 3 | 4 |

*In the past month have the above problems:*

| | | | | | |
|---|---|---|---|---|---|
| P7. Affected your relationships or social life? | 0 | 1 | 2 | 3 | 4 |
| P8. Affected your work or ability to work? | 0 | 1 | 2 | 3 | 4 |
| P9. Affected any other important part of your life such as parenting, or school or college work, or other important activities? | 0 | 1 | 2 | 3 | 4 |

Below are problems that people who have had stressful or traumatic events sometimes experience. The questions refer to ways you typically feel, ways you typically think about yourself and ways you typically relate to others. Answer the following thinking about how true each statement is of you.

| *How true is this of you?* | *Not at all* | *A little bit* | *Moderately* | *Quit a bit* | *Extremely* |
|---|---|---|---|---|---|
| C1. When I am upset, it takes me a long time to calm down. | 0 | 1 | 2 | 3 | 4 |
| C2. I feel numb or emotionally shut down. | 0 | 1 | 2 | 3 | 4 |
| C3. I feel like a failure. | 0 | 1 | 2 | 3 | 4 |
| C4. I feel worthless. | 0 | 1 | 2 | 3 | 4 |
| C5. I feel distant or cut off from people. | 0 | 1 | 2 | 3 | 4 |
| C6. I find it hard to stay emotionally close to people. | 0 | 1 | 2 | 3 | 4 |
| *In the past month, have the above problems in emotions, in beliefs about yourself and in relationships:* | | | | | |
| C7. Created concern or distress about your relationships or social life? | 0 | 1 | 2 | 3 | 4 |
| C8. Affected your work or ability to work? | 0 | 1 | 2 | 3 | 4 |
| C9. Affected any other important parts of your life such as parenting, or school or college work, or other important activities? | 0 | 1 | 2 | 3 | 4 |

*If answering any of these questions have caused you distress, then you can find some support here.*

Questions about the support you are receiving

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Select the “1” if you Very Strongly Disagree - Select the “2” if you Strongly Disagree - Select the “3” if you Mildly Disagree - Select the “4” if you are Neutral – Select the “5” if you Mildly Agree - Select the “6” if you Strongly Agree - Select the “7” if you Very Strongly Agree

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. There is a special person who is around when I am in need. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. There is a special person with whom I can share my joys and sorrows. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. My family really tries to help me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I get the emotional help and support I need from my family. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. I have a special person who is a real source of comfort to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. My friends really try to help me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. I can count on my friends when things go wrong. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. I can talk about my problems with my family. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9. I have friends with whom I can share my joys and sorrows. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. There is a special person in my life who cares about my feelings. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. My family is willing to help me make decisions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. I can talk about my problems with my friends. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Questions about your mental health and wellbeing

[*] Over the last 2 weeks, how often have you been bothered by any of the following problems?

| | Not at all | Several days | More than half the days | Nearly every day |
|---|---|---|---|---|
| 1. Little interest or pleasure in doing things | 0 | 1 | 2 | 3 |
| 2. Feeling down, depressed, or hopeless | 0 | 1 | 2 | 3 |
| 3. Trouble falling or staying asleep, or sleeping too much | 0 | 1 | 2 | 3 |
| 4. Feeling tired or having little energy | 0 | 1 | 2 | 3 |
| 5. Poor appetite or overeating | 0 | 1 | 2 | 3 |
| 6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down | 0 | 1 | 2 | 3 |
| 7. Trouble concentrating on things, such as reading the newspaper or watching television | 0 | 1 | 2 | 3 |
| 8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual | 0 | 1 | 2 | 3 |
| 9. Thoughts that you would be better off dead or of hurting yourself in some way | 0 | 1 | 2 | 3 |

[*] Over the last 2 weeks, how often have you been bothered by any of the following problems?

| | | | | |
|---|---|---|---|---|
| Feeling nervous, anxious or on edge? | Not at all | Several days | More than half the days | Nearly every day |
| Not being able to stop or control worrying? | Not at all | Several days | More than half the days | Nearly every day |

| | | | | |
|---|---|---|---|---|
| Worrying too much about different things? | Not at all | Several days | More than half the days | Nearly every day |
| Trouble relaxing? | Not at all | Several days | More than half the days | Nearly every day |
| Being so restless that it is hard to sit still? | Not at all | Several days | More than half the days | Nearly every day |
| Becoming easily annoyed or irritable? | Not at all | Several days | More than half the days | Nearly every day |
| Feeling afraid as if something awful might happen? | Not at all | Several days | More than half the days | Nearly every day |

[*] For each item. Please mark a tick in the box below that best indicates how much you agree with the following statements as they apply to you over the last month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

| | Not at all true | Rarely true | Sometimes true | Often true | True nearly all the time |
|---|---|---|---|---|---|
| I am able to adapt to when changes occur | | | | | |
| I can deal with whatever comes my way | | | | | |
| I try to see the humorous side of things when I am faced with problems | | | | | |
| Having to cope with stress can make me stronger | | | | | |
| I tend to bounce back after illness, injury, or other hardship | | | | | |
| I believe I can achieve my goals, even if there are obstacles | | | | | |
| Under pressure, I stay focused and think clearly | | | | | |
| I am not easily discouraged by failure | | | | | |
| I think of myself as a strong person when dealing with life’s challenges and difficulties | | | | | |
| I am able to handle unpleasant or painful feelings like sadness, fear, and anger | | | | | |

**Please indicate how often the following apply to you.**

| | Almost Never (0–10%) | Some-times (11–35%) | About Half Of the Time (36–65%) | Most of the Time (66–90%) | Almos Alway (91–100 |
|---|---|---|---|---|---|
| 1. I pay attention to how I feel | 1 | 2 | 3 | 4 | 5 |
| 2. I have no idea how I am feeling | 1 | 2 | 3 | 4 | 5 |
| 3. I have difficulty making sense out of my feelings | 1 | 2 | 3 | 4 | 5 |
| 4. I care about what I am feeling | 1 | 2 | 3 | 4 | 5 |
| 5. I am confused about how I feel | 1 | 2 | 3 | 4 | 5 |
| 6. When I'm upset, I acknowledge my emotions | 1 | 2 | 3 | 4 | 5 |
| 7. When I'm upset, I become embarrassed for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 8. When I'm upset, I have difficulty getting work done | 1 | 2 | 3 | 4 | 5 |
| 9. When I'm upset, I become out of control | 1 | 2 | 3 | 4 | 5 |
| 10. When I'm upset, I believe that I will end up feeling very depressed | 1 | 2 | 3 | 4 | 5 |
| 11. When I'm upset, I have difficulty focusing on other things | 1 | 2 | 3 | 4 | 5 |
| 12. When I'm upset, I feel guilty for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 13. When I'm upset, I have difficulty concentrating | 1 | 2 | 3 | 4 | 5 |
| 14. When I'm upset, I have difficulty controlling my behaviors | 1 | 2 | 3 | 4 | 5 |
| 15. When I'm upset, I believe there is nothing I can do to make myself feel better | 1 | 2 | 3 | 4 | 5 |
| 16. When I'm upset, I become irritated with myself for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 17. When I'm upset, I lose control over my behavior | 1 | 2 | 3 | 4 | 5 |
| 18. When I'm upset, it takes me a long time to feel better | 1 | 2 | 3 | 4 | 5 |

[*] Please read each statement carefully before answering. To the right of each item, indicate how often you behave in the stated manner:

| | Almost Never | | | | Almost Always |
|---|---|---|---|---|---|
| 1. When I fail at something important to me I become consumed by feelings of inadequacy | 1 | 2 | 3 | 4 | 5 |
| 2. I try to be understanding and patient towards those aspects of my personality I don't like | 1 | 2 | 3 | 4 | 5 |
| 3. When something painful happens I try to take a balanced view of the situation | 1 | 2 | 3 | 4 | 5 |
| 4. When I'm feeling down, I tend to feel like most other people are probably happier that I am. | 1 | 2 | 3 | 4 | 5 |
| 5. I try to see my failings as part of the human condition. | 1 | 2 | 3 | 4 | 5 |
| 6. When I'm going through a very hard time, I give myself the caring and tenderness I need. | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| 7. When something upsets me I try to keep my emotions in balance. | 1 | 2 | 3 | 4 | 5 |
| 8.When I fail at something that's important to me, I tend to feel alone in my failure. . | 1 | 2 | 3 | 4 | 5 |
| 9. When I'm feeling down, I tend to obsess and fixate on everything that's wrong. | 1 | 2 | 3 | 4 | 5 |
| 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people. | 1 | 2 | 3 | 4 | 5 |
| 11. I'm disapproving and judgemental about my own flaws and inadequacies. | 1 | 2 | 3 | 4 | 5 |
| 12. I'm intolerant and impatient towards those aspects of my personality I don't like. | 1 | 2 | 3 | 4 | 5 |

"Thank you for taking part in the research. Without people generously giving their time to share their experiences, we wouldn't be able to do the important work we are doing to improve understanding of the impact life experiences on maternal mental health problems. We will keep in touch with you via our newsletter and contact you up to 1 year postpartum to invite you to provide more information. We will also let you know of any additional research opportunities that may be of interest to you. There will be no obligation for you to take part in these future opportunities."

Participant lands on a page providing details of organisations that can provide support (appendix 1)

Six Months Follow up
Text:
"Many thanks for taking part in the National Centre for Mental Health (NCMH) Maternal Wellbeing, Mental Health and Life Experiences survey. We appreciate you taking the time to fill out the questions last time. We ask people who are willing to take part, if they would be kind enough to complete the final follow-up survey answering some more questions about their wellbeing, recent pregnancy, mental health, their life experiences, and thoughts and feelings related to COVID-19. Some of these are new questions, and some are questions you answered before.
These questions today should take roughly 25 minutes to complete. Please remember to click 'Submit' even if you haven't completed all of the questions.
If you have any questions or would like further information, please contact us on (PHONE NUMBER) or (EMAIL ADDRESS).
Once again, thank you very much for helping with our research. Together we can make a difference for maternal wellbeing and mental health."

*ALL PARTICIPANTS*

Questions about the support you receive
Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Select the “1” if you Very Strongly Disagree - Select the “2” if you Strongly Disagree - Select the “3” if you Mildly Disagree - Select the “4” if you are Neutral – Select the “5” if you Mildly Agree - Select the “6” if you Strongly Agree - Select the “7” if you Very Strongly Agree

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. There is a special person who is around when I am in need. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. There is a special person with whom I can share my joys and sorrows. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. My family really tries to help me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I get the emotional help and support I need from my family. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. I have a special person who is a real source of comfort to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. My friends really try to help me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. I can count on my friends when things go wrong. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. I can talk about my problems with my family. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. I have friends with whom I can share my joys and sorrows. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. There is a special person in my life who cares about my feelings. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. My family is willing to help me make decisions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. I can talk about my problems with my friends. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Questions about the COVID-19 crisis:

Have you displayed symptoms of COVID-19? [Yes/No]
Have you tested positive for COVID-19? [Yes/No]
Do you believe you have been in close contact with someone with COVID-19? [Yes/No]

Have you experienced any of the following as a result of the COVID-19 pandemic?

| | |
|---|---|
| Lost your job / been unable to do paid work | |
| Your spouse/partner lost their job or was unable to do paid work | |
| Unable to pay bills | |
| Evicted/lost accommodation | |
| Unable to access sufficient food | |
| Unable to access required medication | |
| Somebody close to you is in hospital with COVID-19 | |
| You lost somebody close to you with COVID-19 | |
| None of the above | |

[*] Are you worried about your mental health as a result of COVID-19? [Very worried 5-1 Not worried at all]
[*] Are you worried about your physical health as a result of COVID-19? [Very worried 5-1 Not worried at all]
[*] Are you worried about your personal finances as a result of COVID-19? [Very worried 5-1 Not worried at all]
[*] How often do you think about COVID-19? [Very often 5-1 Not at all]

[*] Have you experienced distress in response to the COVID-19 restrictions placed on your health care appointments (e.g. restrictions on birth partners or family members attending appointments with you?) [A lot of distress 5-1 No distress]

[*] Have you had difficulties accessing the following services during the COVID-19 pandemic?

| | *Not applicable / I don't think this would help me* | *I have been able to access this help* | *I have had difficulties accessing this help* |
|---|---|---|---|
| Visiting your GP | | | |
| Antenatal scans | | | |
| Midwife visits | | | |
| Vaccine appointments for your baby | | | |
| Perinatal mental health services | | | |
| Health visiting | | | |
| Family support services (e.g. flying start, family nurse partnership) | | | |
| Having a birthing partner and/or family member present at appointments | | | |

During the current pregnancy/postnatal period, have you received assessment and/or treatment from a perinatal mental health service (e.g. spoken to a mental health nurse/ psychiatrist/psychologist)
a. Yes, assessed and discharged
b. Yes assessed and provided treatment e.g. medication, psychological therapy, psychosocial support
c. No
During the current pregnancy/postnatal period, have you received mental health assessment and/or treatment from:
-NHS primary care mental health service (e.g. GP referred you to a counsellor or another mental health professional) Yes/No
-Third sector (e.g. charities like MIND, NSPCC) Yes/No
-Private provider? Yes/No

[*] Do you feel fully supported by the health system throughout pregnancy?
1 (Not supported at all) 2 3 4 5 (Fully supported)

[*] Indicate for each of the statements below the degree to which this change occurred in your life as a result of the COVID-19 outbreak, using the following scale.

0 = I did not experience this change as a result of this crisis.
1 = I experienced this change to a very small degree as a result of this crisis.
2 = I experienced this change to a small degree as a result of this crisis.
3 = I experienced this change to a moderate degree as a result of this crisis.
4 = I experienced this change to a great degree as a result of this crisis.
5 = I experienced this change to a very great degree as a result of this crisis.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. I changed my priorities about what is important in life. | 0 | 1 | 2 | 3 | 4 | 5 |
| 2. I have a greater appreciation for the value of my own life. | 0 | 1 | 2 | 3 | 4 | 5 |
| 3. I am able to do better things with my life. (II-11) | 0 | 1 | 2 | 3 | 4 | 5 |
| 4. I have a better understanding of spiritual matters. (IV-5) | 0 | 1 | 2 | 3 | 4 | 5 |
| 5. I have a greater sense of closeness with others. (I-8) | 0 | 1 | 2 | 3 | 4 | 5 |
| 6. I established a new path for my life. (II-7) | 0 | 1 | 2 | 3 | 4 | 5 |
| 7. I know better that I can handle difficulties. (III-10) | 0 | 1 | 2 | 3 | 4 | 5 |
| 8. I have a stronger religious faith. (IV-18) | 0 | 1 | 2 | 3 | 4 | 5 |
| 9. I discovered that I'm stronger than I thought I was. (III-19) | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. I learned a great deal about how wonderful people are. (I-20) | 0 | 1 | 2 | 3 | 4 | 5 |

Please identify the life experience that troubles you most and answer the questions in relation to this experience.

Age this experience started?

Brief description of the experience:

_____

When did the experience occur?
less than 6 months ago
6 to 12 months ago
1 to 5 years ago
5 to 10 years ago
10 to 20 years ago
more than 20 years ago

[*] Below are a number of problems that people sometimes report in response to traumatic or stressful life events. Please read each item carefully, then select the options to the right to indicate how much you have been bothered by that problem in the past month in relation to the worst traumatic event that has happened to you.

| | *Not at all* | *A little bit* | *Moderately* | *Quite a bit* | *Extremely* |
|---|---|---|---|---|---|
| P1. Having upsetting dreams that replay part of the experience or are clearly related to the experience? | 0 | 1 | 2 | 3 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| P2. Having powerful images or memories that sometimes come into your mind in which you feel the experience is happening again in the here and now? | 0 | 1 | 2 | 3 | 4 |
| P3. Avoiding internal reminders of the experience (for example, thoughts, feelings, or physical sensations)? | 0 | 1 | 2 | 3 | 4 |
| P4. Avoiding external reminders of the experience (for example, people, places, conversations, objects, activities, or situations)? | 0 | 1 | 2 | 3 | 4 |
| P5. Being “super-alert”, watchful, or on guard? | 0 | 1 | 2 | 3 | 4 |
| P6. Feeling jumpy or easily startled? | 0 | 1 | 2 | 3 | 4 |

*In the past month have the above problems:*

| | | | | | |
|---|---|---|---|---|---|
| P7. Affected your relationships or social life? | 0 | 1 | 2 | 3 | 4 |
| P8. Affected your work or ability to work? | 0 | 1 | 2 | 3 | 4 |
| P9. Affected any other important part of your life such as parenting, or school or college work, or other important activities? | 0 | 1 | 2 | 3 | 4 |

Below are problems that people who have had stressful or traumatic events sometimes experience. The questions refer to ways you typically feel, ways you typically think about yourself and ways you typically relate to others. Answer the following thinking about how true each statement is of you.

| *How true is this of you?* | *Not at all* | *A little bit* | *Moderately* | *Quit a bit* | *Extremely* |
|---|---|---|---|---|---|
| C1. When I am upset, it takes me a long time to calm down. | 0 | 1 | 2 | 3 | 4 |
| C2. I feel numb or emotionally shut down. | 0 | 1 | 2 | 3 | 4 |
| C3. I feel like a failure. | 0 | 1 | 2 | 3 | 4 |
| C4. I feel worthless. | 0 | 1 | 2 | 3 | 4 |
| C5. I feel distant or cut off from people. | 0 | 1 | 2 | 3 | 4 |
| C6. I find it hard to stay emotionally close to people. | 0 | 1 | 2 | 3 | 4 |
| *In the past month, have the above problems in emotions, in beliefs about yourself and in relationships:* | | | | | |
| C7. Created concern or distress about your relationships or social life? | 0 | 1 | 2 | 3 | 4 |
| C8. Affected your work or ability to work? | 0 | 1 | 2 | 3 | 4 |
| C9. Affected any other important parts of your life such as parenting, or school or college work, or other important activities? | 0 | 1 | 2 | 3 | 4 |

*If answering any of these questions have caused you distress, then you can find some support here.*

[*] Over the last 2 weeks, how often have you been bothered by any of the following problems?

| | Not at all | Several days | More than half the days | Nearly every day |
|---|---|---|---|---|
| 1. Little interest or pleasure in doing things | 0 | 1 | 2 | 3 |
| 2. Feeling down, depressed, or hopeless | 0 | 1 | 2 | 3 |
| 3. Trouble falling or staying asleep, or sleeping too much | 0 | 1 | 2 | 3 |
| 4. Feeling tired or having little energy | 0 | 1 | 2 | 3 |

| | | | | |
|---|---|---|---|---|
| 5. Poor appetite or overeating | 0 | 1 | 2 | 3 |
| 6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down | 0 | 1 | 2 | 3 |
| 7. Trouble concentrating on things, such as reading the newspaper or watching television | 0 | 1 | 2 | 3 |
| 8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual | 0 | 1 | 2 | 3 |
| 9. Thoughts that you would be better off dead or of hurting yourself in some way | 0 | 1 | 2 | 3 |

[*] Over the last 2 weeks, how often have you been bothered by any of the following problems?

| | | | | |
|---|---|---|---|---|
| Feeling nervous, anxious or on edge? | Not at all | Several days | More than half the days | Nearly every day |
| Not being able to stop or control worrying? | Not at all | Several days | More than half the days | Nearly every day |
| Worrying too much about different things? | Not at all | Several days | More than half the days | Nearly every day |
| Trouble relaxing? | Not at all | Several days | More than half the days | Nearly every day |
| Being so restless that it is hard to sit still? | Not at all | Several days | More than half the days | Nearly every day |
| Becoming easily annoyed or irritable? | Not at all | Several days | More than half the days | Nearly every day |
| Feeling afraid as if something awful might happen? | Not at all | Several days | More than half the days | Nearly every day |

[*] For each item. Please mark a tick in the box below that best indicates how much you agree with the following statements as they apply to you over the last month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

| | Not at all true | Rarely true | Sometimes true | Often true | True nearly all the time |
|---|---|---|---|---|---|
| I am able to adapt to when changes occur | | | | | |
| I can deal with whatever comes my way | | | | | |
| I try to see the humorous side of things when I am faced with problems | | | | | |
| Having to cope with stress can make me stronger | | | | | |
| I tend to bounce back after illness, injury, or other hardship | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| I believe I can achieve my goals, even if there are obstacles | | | | | |
| Under pressure, I stay focused and think clearly | | | | | |
| I am not easily discouraged by failure | | | | | |
| I think of myself as a strong person when dealing with life's challenges and difficulties | | | | | |
| I am able to handle unpleasant or painful feelings like sadness, fear, and anger | | | | | |

**Please indicate how often the following apply to you.**

| | Almost Never (0–10%) | Some-times (11–35%) | About Half Of the Time (36–65%) | Most of the Time (66–90%) | Almos Alway (91–100 |
|---|---|---|---|---|---|
| 1. I pay attention to how I feel | 1 | 2 | 3 | 4 | 5 |
| 2. I have no idea how I am feeling | 1 | 2 | 3 | 4 | 5 |
| 3. I have difficulty making sense out of my feelings | 1 | 2 | 3 | 4 | 5 |
| 4. I care about what I am feeling | 1 | 2 | 3 | 4 | 5 |
| 5. I am confused about how I feel | 1 | 2 | 3 | 4 | 5 |
| 6. When I'm upset, I acknowledge my emotions | 1 | 2 | 3 | 4 | 5 |
| 7. When I'm upset, I become embarrassed for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 8. When I'm upset, I have difficulty getting work done | 1 | 2 | 3 | 4 | 5 |
| 9. When I'm upset, I become out of control | 1 | 2 | 3 | 4 | 5 |
| 10. When I'm upset, I believe that I will end up feeling very depressed | 1 | 2 | 3 | 4 | 5 |
| 11. When I'm upset, I have difficulty focusing on other things | 1 | 2 | 3 | 4 | 5 |
| 12. When I'm upset, I feel guilty for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 13. When I'm upset, I have difficulty concentrating | 1 | 2 | 3 | 4 | 5 |
| 14. When I'm upset, I have difficulty controlling my behaviors | 1 | 2 | 3 | 4 | 5 |
| 15. When I'm upset, I believe there is nothing I can do to make myself feel better | 1 | 2 | 3 | 4 | 5 |
| 16. When I'm upset, I become irritated with myself for feeling that way | 1 | 2 | 3 | 4 | 5 |
| 17. When I'm upset, I lose control over my behavior | 1 | 2 | 3 | 4 | 5 |
| 18. When I'm upset, it takes me a long time to feel better | 1 | 2 | 3 | 4 | 5 |

[*] Please read each statement carefully before answering. To the right of each item, indicate how often you behave in the stated manner:

| | Almost Never | | | | Almost Always |
|---|---|---|---|---|---|
| 1. When I fail at something important to me I become consumed by feelings of inadequacy | 1 | 2 | 3 | 4 | 5 |
| 2. I try to be understanding and patient towards those aspects of my personality I don't like | 1 | 2 | 3 | 4 | 5 |
| 3. When something painful happens I try to take a balanced view of the situation | 1 | 2 | 3 | 4 | 5 |
| 4. When I'm feeling down, I tend to feel like most other people are probably happier that I am. | 1 | 2 | 3 | 4 | 5 |
| 5. I try to see my failings as part of the human condition. | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| 6. When I'm going through a very hard time, I give myself the caring and tenderness I need. | 1 | 2 | 3 | 4 | 5 |
| 7. When something upsets me I try to keep my emotions in balance. | 1 | 2 | 3 | 4 | 5 |
| 8.When I fail at something that's important to me, I tend to feel alone in my failure. . | 1 | 2 | 3 | 4 | 5 |
| 9. When I'm feeling down, I tend to obsess and fixate on everything that's wrong. | 1 | 2 | 3 | 4 | 5 |
| 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people. | 1 | 2 | 3 | 4 | 5 |
| 11. I'm disapproving and judgemental about my own flaws and inadequacies. | 1 | 2 | 3 | 4 | 5 |
| 12. I'm intolerant and impatient towards those aspects of my personality I don't like. | 1 | 2 | 3 | 4 | 5 |

"Thank you for taking part in the research. Without people generously giving their time to share their experiences, we wouldn't be able to do the important work we are doing to improve understanding of the impact life experiences on maternal mental health problems. We will keep in touch with you via our newsletter. We will also let you know of any additional research opportunities that may be of interest to you. There will be no obligation for you to take part in these future opportunities."

Participant lands on a page providing details of organisations that can provide support (appendix 1)

Appendix 1

*[The list of support organisations may be altered/adapted at any given time to ensure up to date contact information is provided for the most appropriate organisations.]*
Thank you for taking part in the research. Without people generously giving their time to share their experiences, we wouldn't be able to do the important work we are doing to improve understanding of the impact of life experiences on maternal wellbeing & mental health.
The questions covered some emotional topics and we understand that they can sometimes bring up difficult memories or feelings such sadness or anger. The information below may be helpful if you feel the need for additional support.

If you are worried about how you are feeling, and at an immediate risk, please call 999.

If you are worried and need to talk to somebody, we recommend that you get in touch with your GP surgery. They will be available both during office hours and evenings and weekends through the out-of-hours service.

If you are under the care of a community mental health team or a crisis team, we recommend that you contact them.

The following organisations offer free listening, emotional support and information services:

If you are not in immediate danger, you can visit **www.nhs.uk/conditions/suicide/**, or call one of the following helplines:

Support services and help lines

Samaritans

Samaritans provide support 24/7 for people who are experiencing feelings of distress or despair including those which could lead to suicide.

Call the helpline: 116 123 – Welsh language help is available at: 0808 164 0123 - https://www.samaritans.org/?nation=wales

MIND

Mind is the leading mental health charity in England and Wales. They aim to create a better life for everyone experiencing mental distress.

National: 0300 123 3393 – Cardiff MIND: 0292 0402 040 – Newport MIND: 01633 258741 – Caerphilly Borough Mind: 01443 816945 - https://www.mind.org.uk/

C.A.L.L- Community Advice & Listening Line Mental Health Helpline for Wales.

For emotional support and information if you live in Wales 24 hours a day, 365 days a year

Call 0800 132737 (calls are free)

Or text 'help' followed by a question to 81066

Welsh Women's Aid

Welsh Women's Aid provide support and offer a helpline for women in Wales who have experienced domestic abuse and all forms of violence against women.

Tel: 0808 80 10 800 - Email: info@livefearfreehelpline.wales - https://www.welshwomensaid.org.uk/

Papyrus

Papyrus is a UK charity for those dealing with issues such as suicide, depression or emotional distress. There is a free helpline offering practical advice on suicide prevention.

Tel: 0800 068 4141 – Email: pat@papyrus-uk.org - https://papyrus-uk.org/

NAPAC

NAPAC support recovery from childhood abuse. They offer support to adult survivors and training for those who support them.

Tel: 0808 801 0331 - https://napac.org.uk/

The Mix

For emotional support if you are under 25 from 4pm–11pm, 365 days a year

Call 0808 808 4994 (calls are free)

Or text THEMIX to 85258

**Shout Crisis Text Line**

24 hours a day, 365 days a year.

Text 'Shout' to 85258

**SANEline**

4.30pm-10.30pm, 365 days a year.
You can leave a message on 07984 967 708 giving your first name and a contact number.
You can also email at support@sane.org.uk."

Pregnancy and parenting support

NCT: New parent support
NCT provide information and support through pregnancy, birth and beyond. They provide practical and emotional support.
Helpline: 0300 330 0700 - https://www.nct.org.uk/
PANDAS
PANDAS Foundation gives support to people coping with Pre and Postnatal Mental Illnesses, as well as their families, friends and carers.
Helpline: 0843 28 98 401 – Email: info@pandasfoundation.org.uk - http://www.pandasfoundation.org.uk/
APNI: Association for Post Natal Illness
APNI provide support to those affected by Post-Natal illness and Post-Natal depression.
Tel: 020 7386 0868 - https://apni.org/

Action on Postpartum Psychosis (APP)
A national charity for women and families affected by Postpartum Psychosis (PP).
https://www.app-network.org/

Thank you once again for taking part in the research, your contribution is invaluable.