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Review article

Trauma measures for use with psychosis populations: A systematic review of psychometric properties using COSMIN

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ABSTRACT

Traumatic events play a key role in the development and course of psychosis. Psychotic symptoms themselves and coercive treatment practices can be inherently traumatic. Hence, reliable and valid methods of assessing trauma and its impact (i.e., Post-Traumatic Stress Disorder (PTSD) symptomology) are essential for use with people with psychosis. Many measures are available to select from, but this is the first review to appraise the psychometric properties of trauma measures to guide decision making regarding instrument use. The review was prospectively registered on Prospero (CRD42022306100). Evaluation of methodological and psychometric quality followed Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) guidance. Twenty-four articles were eligible, with sixteen trauma measures evaluated. Childhood Trauma Questionnaire- Short Form demonstrated the most robust evidence for assessing experience of trauma. The Trauma and Life Experience (TALE) checklist was the only measure to include specific psychosis and iatrogenic harm items. For PTSD measures, the Symptoms of Trauma Scale and PTSD Symptom Scale– Self Report had the highest quality evidence. Psychometric strengths and weaknesses of various trauma measures are comprehensively evaluated, highlighting future research directions to strengthen the evidence base with emphasis on further evaluation of the TALE, which integrates trauma specific to psychosis.

1. Introduction

Lifetime experience of trauma, particularly in childhood, is common in patients with psychosis (Morgan and Fisher, 2007), and has been linked to symptom development (Schäfer and Fisher, 2011). Multiple traumatic experiences increase likelihood of psychosis development (Shevlin et al., 2008), and there is increasing evidence for a dose-response relationship (Varese et al., 2012). Experiencing any traumatic event increases likelihood of developing psychotic experiences by three times, with associations persisting after adjusting for mental disorders (McGrath et al., 2017). Exposure to trauma has also been linked to greater symptom severity, particularly for positive symptoms (i.e., hallucinations and delusions; Bailey et al., 2018; Peach et al., 2021), and traumatic events after psychosis onset are linked to relapse (Martland et al., 2020). While the relationship between psychosis and trauma is deemed complex and multifactorial, with directions and causality still debated (Hardy and Mueser, 2017), trauma is an important consideration when working with psychosis clinically or in research settings.

Despite high exposure to trauma in individuals with serious mental health problems, concerns have been raised about poor detection and diagnosis in services (Mueser et al., 1998). People with psychotic disorders are less likely to be assessed for trauma (Read et al., 2018). Detection may also be affected by similarities in psychosis and Post-Traumatic Stress Disorder (PTSD) presentations (OConghaile and DeLisi, 2015). The epidemiology of PTSD in psychosis is estimated at 29% prevalence comparative to 7.8% in the general population (Buckley et al., 2009), although challenges with detection suggest the former could be higher. While much of the literature has focused on childhood adversity, there is evidence that traumatic adult life events are associated with psychotic illness and subclinical psychotic symptoms (Beards et al., 2013). It is also important to highlight the potential traumatic impact of psychosis itself, with a review identifying prevalence rates of PTSD from the trauma of psychosis symptoms and/or hospitalisation

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between 11 and 67% (Berry et al., 2013). Now termed "psychosis-related PTSD", an update on the former review indicated estimated rates between 14 and 47% (Buswell et al., 2021), although acknowledged limited data beyond first-episode psychosis. Qualitative interviews with psychosis patients has indicated that the onset and experience of psychosis itself can be inherently traumatic, along with aspects of treatment including involuntary admissions, seclusion and forced medication (Lu et al., 2017).

Clinicians have expressed reluctance in asking about trauma due to fears of exacerbating risk, distress, or psychosis symptoms, screening itself being iatrogenic, workload pressures and systemic barriers in services (Berliner and Kolko, 2016; Chadwick and Billings, 2022; Gairns et al., 2015). Conversely, patients may anticipate being asked about traumatic experiences, despite the potential for short-term distress (Dryden-Mead et al., 2022). Patients have also reported perceived negative consequences of not having the opportunity to speak about their trauma, and have linked content and characteristics of their psychosis to the trauma (Campodonico et al., 2022). The opportunity to speak about traumatic experiences may depend on the line of enquiry. A broad "abuse" question or particular focus on specific abuse types may not evoke comprehensive responses that encompass the full extent of an individual's trauma history (Barnes et al., 2021). Indeed, one study found discrepancies between self-report measures and subsequent interview about life history, with more disclosure in self-report form in some cases (Jansen et al., 2016). This emphasises a useful role for self-report measures with psychosis populations as they may aid self-disclosure. Recent research to develop a consensus for Patient-Reported Outcome Measures (PROMs) for use with psychotic disorders did not include any specific trauma measures (McKenzie et al., 2022). There are many trauma measures available within the literature, for assessing both the experience of trauma and PTSD symptomology (Brewin, 2005; Roy and Perry, 2004), however consideration of whether these are suitable for use with psychosis populations is required.

This review employed COSMIN (COnsesnus-based Standards for the selection of health Measurement INstruments) methodology, the only manualised and consensus-based approach available to evaluate health measurement instruments (Mokkink et al., 2010a, 2010b, 2018b), which provides clear definitions and reasonable expectations for measurement properties. The primary properties evaluated were reliability, defined as "*the extent to which scores for patients who have not changed are the same for repeated measurement under several conditions*" and validity, defined as "*the degree to which the instrument measures the construct(s) it purports to measure*" (Mokkink et al., 2010b).

This review aimed to systematically identify, evaluate, and summarise methodological and psychometric quality of available instruments, per the COSMIN taxonomy and methodology, which assess: (i) the presence of traumatic events in an individual's lifetime or (ii) PTSD symptomology or current impact of past trauma, for use in individuals with diagnoses of non-affective psychosis. It was anticipated that recommendations would be formulated to aid effective instrument selection for use with psychosis populations in clinical practice or research.

2. Methods

The review was completed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021; see Supplementary Table A.1 for PRISMA guidelines). The protocol was prospectively registered on Prospero (CRD42022306100).

2.1. Search Strategy

A systematic search of PsycINFO, MEDLINE, Embase, CINAHL Plus, and Web of Science was undertaken from inception to 01 November 2022. The search terms were: ((Schizophreni* *OR* Schizoaffective *OR* Psychosis *OR* Psychotic *OR* Paranoia *OR* Serious Mental Illness *OR* Severe Mental Illness) AND (Trauma *OR* PTSD *OR* Post*Traumatic Stress *OR* Posttraumatic Stress *OR* Trauma symptoms) AND (Instrument *OR* Scale *OR* Questionnaire *OR* Interview *OR* Measure *OR* Index *OR* Test *OR* Checklist *OR* Tool *OR* Outcome *OR* Assess*) AND (Valid* *OR* Reliab* *OR* Psychometric* *OR* Factor Analy* *OR* Internal Consistency *OR* Reproducibility)). Reference lists of included papers were hand-searched and a forward-search of their citations was also completed to identify additional records. Articles were initially screened for eligibility through title and abstract and subsequently full text review. A second reviewer independently rated eligibility for paper inclusion for 10% of the overall sample, which indicated near perfect agreement (Cohen's κ=.91; 99.39% agreement). Moreover, 40% of the full text papers were independently reviewed, again indicating near perfect agreement (Cohen's κ=.93; 96.55% agreement). For the few disagreements, the rationale for each rater's decision was discussed and a consensus reached.

2.2. Eligibility criteria

Inclusion criteria were studies: (a) assessing psychometric properties of instruments measuring trauma (experience of trauma (historical or recent) or PTSD symptomology/ rating current impact of the trauma) in people with diagnoses of non-affective psychosis; (b) where a main aim of the study was assessing psychometric properties of an instrument; (c) reporting at least one aspect of reliability or validity (see Table 1); (d) publication in English language; and (e) full-text article available in a peer-reviewed journal.

Exclusion criteria were: (a) studies employing single items and/ or questions that can only be answered in qualitative form to assess trauma; (b) samples including participants exclusively under 14 years old or where participants younger than 14 are included and for which the results are not separated by age; (c) sample with less than 60% diagnosed with non-affective psychosis if the results is not separated by subgroups of diagnosis; (d) case studies, personal accounts, conference papers, unpublished dissertations or reviews.

2.3. Data extraction

Descriptive characteristics for the studies (sample, study setting) and included instruments (administration, structure, scoring) was collated; this was extracted verbatim and later summarised in categories. Authors were contacted if the information was not available in the paper. Statistical information assessing aspects of reliability and validity were extracted (see Table 1), e.g., Cronbach's α, κ, correlation coefficients and factor analysis statistics. Statistical and methodological information was extracted and evaluated using the manualised COSMIN approach (Mokkink et al., 2010a, 2010b, 2018a, 2018b; Prinsen et al., 2018; Terwee et al., 2018). The lead author completed data extraction.

2.4. Quality assessment

Studies were evaluated utilising the COSMIN methodology (Mokkink, et al., 2018b), which provides clear and relevant items to evaluate health-related outcome measures. The manual was followed to evaluate methodological quality and measurement properties in the available studies.

The risk of bias checklist enabled methodological (design, methods, statistical method) quality assessment without bias by quality or strength of psychometric properties and comprised of 114 items separated into ten boxes. Boxes 1 and 2 assessed instrument development and content validity. Boxes 3 through 10 assessed aspects of internal structure (structural validity, internal consistency, cross-cultural validity), reliability (test-retest, measurement error) and validity (criterion validity, hypothesis testing for construct validity, responsiveness).

Methodological quality ratings were based on predefined criteria in the COSMIN manual (Mokkink et al., 2018b), with quality rated as very good, adequate, doubtful, inadequate, or 'not applicable' if the

Table 1
Definitions and COSMIN evaluation standards for measurement properties.

Measurement Property	COSMIN definition	Statistical rating Rating on COSMIN	COSMIN criteria
Reliability			
Internal Consistency	*The degree of interrelatedness among items*	+	At least low evidence for sufficient structural validity AND Cronbach's alpha(s) ≥ 0.70 for each unidimensional scale or subscale
		?	Criteria for "At least low evidence for sufficient structural validity" not met
		-	At least low evidence for sufficient structural validity AND Cronbach's alpha(s) < 0.70 for each unidimensional scale or subscale
Measurement Error	*The systematic and random error of a patient's score that is not attributed to true changes in the construct to be measured*	+	SDC or LoA < MIC
		?	MIC not defined
		-	SDC or LoA > MIC
Test-Retest	*The proportion of the total variance in the measurements which is because of "true'' differences among patient*	+	ICC or weighted Kappa ≥ .7
		?	ICC or weighted Kappa not reported
		-	ICC or weighted Kappa <.7
Validity			
Criterion Validity	*The degree to which the scores of an instrument are an adequate reflection of a "gold standard''*	+	Correlation with gold standard ≥ 0.70 OR AUC ≥ 0.70
		?	Not all information for '+' reported
		-	Correlation with gold standard < 0.70 OR AUC < 0.70
Cross-cultural validity	*The degree to which the performance of the items on a translated or culturally adapted instrument are an adequate reflection of the performance of the items of the original version of the instrument*	+	No important differences found between group factors (such as age, gender, language) in multiple group factor analysis OR no important DIF for group factors (McFadden's R2 < 0.02)
		?	No multiple group factor analysis OR DIF analysis performed
		-	Important differences between group factors OR DIF was found
Hypothesis Testing for Construct Validity	*The degree to which the scores of an instrument are consistent with hypotheses (for instance with regard to internal relationships, relationships to scores of other instruments, or differences between relevant groups) based on the assumption that the instrument validly measures the construct to be measured*	+	The result is in accordance with the hypothesis
		?	No hypothesis defined (by the review team)
		-	The result is not in accordance with the hypothesis
Structural Validity	*The degree to which the scores of an instrument are an adequate reflection of the dimensionality of the construct to be measured*	+	CTT: CFA: CFI or TLI or comparable measure >0.95 OR RMSEA <0.06 OR SRMR <0.08 IRT/Rasch: No violation of unidimensionality: CFI or TLI or comparable measure >0.95 OR RMSEA <0.06 OR SRMR <0.08 *AND* no violation of local independence: residual correlations among the items after controlling for the dominant factor < 0.20 OR Q3's < 0.37 *AND* no violation of monotonicity: adequate looking graphs OR item scalability >0.30 *AND* adequate model fit: IRT: χ2 >0.01Rasch: infit and outfit mean squares ≥ 0.5 and ≤ 1.5 OR Z-standardized values > -2 and <2
		?	CTT: Not all information for '+' reported. IRT/ Rasch: Model fit not reported
		-	Criteria for '+' not met
Responsiveness			
	The ability of an instrument to detect change over time in the construct to be measured	+	The result is in accordance with the hypothesis OR AUC ≥ 0.70
		?	No hypothesis defined (by the review team)
		-	The result is not in accordance with the hypothesis or AUC < 0.70

psychometric property was not assessed. For each box, which refers to a different psychometric property, item scores were pooled and an overall score determined using a 'worse score counts' method (Terwee et al., 2012). These informed overall quality ratings. All items were rated by the lead author, a second reviewer assessed 25% of included papers to check inter-rater reliability. Kappa was calculated and indicated substantial agreement (Cohen's κ=.68; 80.73% agreement).

Subsequently, the quality of psychometric properties were rated as sufficient (+), insufficient (-) or indeterminate (?) using the Terwee (2007) and Prinsen (2016) criteria (see Table 1). This considers the strength of a psychometric property, using standard statistical conventions, and integrates some basic methodological requirements (e.g., some evidence of structural validity must be available alongside appropriate statistics for internal consistency to be rated as 'sufficient'). Ratings were then quantitatively summarised. The rating criteria described above was used unless the ratings between studies were inconsistent (±).

Finally, a modified version of the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) approach was used

to determine overall evidence quality (Mokkink et al., 2018b; Schunemann et al., 2013). This assumed 'high' quality evidence with potential for downgrading based on: risk of bias (determined by methodological quality ratings), inconsistency of results, imprecision (based on sample size), and indirectness of evidence. Psychometric and overall quality ratings were completed by the lead author with supervision and support provided by the other authors; any queries or disagreements were resolved through discussion between the authors.

3. Results

The search yielded 3562 records and a further 2411 were identified from reference lists and citation searches. Following duplicate removal and abstract and title screening, 87 records were retrieved for full text review, which resulted in inclusion of 24 articles (Fig. 1).

Of the 24 papers (Table 2), the studies were primarily undertaken in Western countries (n=20; Europe, North America), four were undertaken in Asia. Participant samples were between 19 and 2608 (M= 199.54, SD= 517.01). While one study had a large sample of 2608, only 455 met criteria for PTSD and could provide data toward the statistical analyses reviewed here (De Bont et al., 2015), despite the decrease in the sample size this study remained the largest sample size in the review. Most studies were undertaken in clinical settings, primarily outpatient settings (n=15), however one study used secondary data from outpatient research trials (Cay et al., 2022). Five studies were situated in inpatient settings and two had combined inpatient and outpatient samples. Participants' ages ranged from 14 upward, with average ages between 17 and 48. For most studies (n= 22), 60% or more of the clinical sample had a diagnosis of a non-affective schizophrenia-spectrum disorder. Two studies analysed statistics for psychosis participants separately from other participants in their sample, hence could be included (Cay et al., 2022; Kongerslev et al., 2019). Sixteen studies had a larger proportion of male participants than females. One study did not include any male participants (Gearon et al., 2004). All but one study focused on evaluating psychometric properties of a single trauma measure (Goodman et al., 1999). Most studies (n=15) assessed two psychometric properties, five assessed three or more properties and a further four assessed just one property.

Within these studies, 16 distinct measures of trauma were evaluated regarding their psychometric properties. Table 3 summarises the measures. Of these, nine measured life experiences of trauma and seven assessed the current impact of trauma, typically PTSD symptomology. Different iterations of these measures were included, regarding version and language. Two versions of the PTSD Checklist (PCL) for Diagnostic and Statistical Manual of Mental Disorders (DSM) were evaluated: the original DSM-IV version (PCL; Blanchard et al., 1996) and the updated version for DSM-5 (PCL-5; Weathers et al., 2013). While most measures were in English, seven studies used translated versions of English measures (Chatziioannidis et al., 2021; De Bont et al., 2015; Jiang et al., 2018; Kasznia et al., 2021; Kim et al., 2013; Kongerslev et al., 2019; Xiang et al., 2021) and two measures were developed in other languages (Paino et al., 2020; Styla and Makoveychuk, 2018). Most measures were self-rated (or clinician-supported), two measures were clinician-rated questionnaires that corresponded to a structured interview schedule undertaken with the participant, and one was clinician-rated from archival clinical records.

Statistics from all 24 studies are appraised here. Table 4 presents the ratings for psychometric quality, along with an overall 'quality of

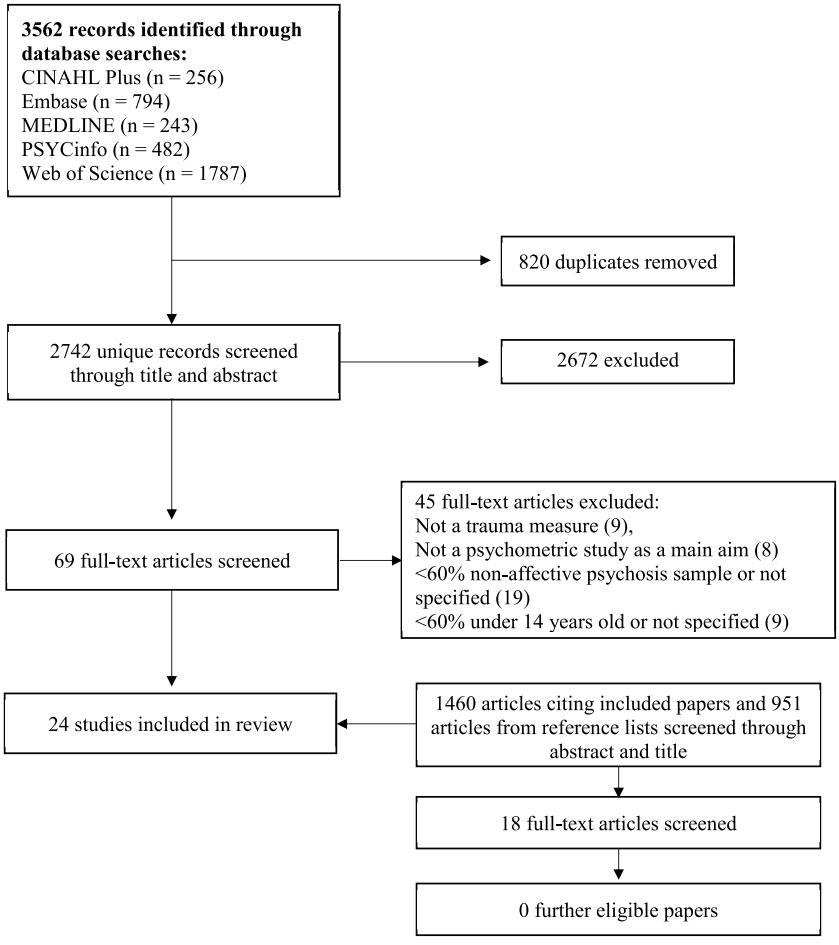

Fig. 1. PRISMA flow diagram for identification of studies.

Table 2
Overview of included articles.

Study	Location (Language if not English)	*N*	Age *M(SD); range*	Gender (% Male)	Diagnoses	Setting	Trauma Measure(s) Reviewed	Psychometric variable(s) assessed
Carr et al. (2018)	UK	39	32.59 (13.54)	51.3%	20.5% SZ 2.6% STD 5.1% SZA 43.6% Psychosis NOS 28.2% Affective Disorders	Outpatient	TALE	TR, HT
Cay et al. (2022)	USA	19	26.4; *+/- 7.1*	58%	SZ	Outpatient research trials	CTQ-SF	IC, TR
Chatziioannidis et al. (2021)	Greece (Greek)	63	40.44 (10.00)	69.84%	DSM-IV criteria for SZ and Other Psychotic Disorders*	Inpatient (Time 1) Outpatient (Time 2)	CECA.Q	TR, HT
Choi et al., (2012)	USA	150	38.80 (12.33)	48%	51.3% SZ 32.7% SA 12% BD 2% Psychotic Disorder NOS	Inpatient	MCSˆ	IR, HT
Cristofaro et al. (2013)	USA	205	24.2; *18-39*	73.7%	60% SZ 13.7% Psychotic Disorder NOS 12.2% SA 11.2% SPD 2% DD 1% BPD	Inpatient	TEC	SV, IC, HT
de Bont et al. (2015)	Netherlands (Dutch)	2608 (455 only for relevant analysis)	41.9 (40.9 in relevant analysis group)	61.8%	54.3% SZ 10.9% SA 21.3% DD, Psychotic Disorder NOS or BPD 6.9% BD/P 3.8% D/P 2.8% Other	Secondary or tertiary mental health care	TSQ	CV
Fisher et al. (2011)	UK	84	31 (12.1); *16-64*	56.0%	ICD-10 codes F20-29, F30-33	Outpatient	CECA.Q	TR, CV
Ford et al. (2017)	USA (English or Spanish)	184	38 (11.0); *18-65*	60.33%	39% SZ 31% SA 18% BD 7% D	Outpatient	SOTS	IC, HT
Gayer-Anderson et al. (2020)	UK	234	Median=26[#] IQR=22-32[#] *18-64*	64%	ICD-10 codes F20-29, F30-33	Outpatient	CTQ-SF	HT
Gearon et al. (2004)	USA	19	40.58 (6.77)	0%	SZ and co-occurring drug use disorder	Outpatient	CAPS-S	IC, TR, CV, HT, IR
Goodman et al. (1999)	USA	50	M 37.6 (7.3) F 42.1 (7.6)	62%	64% SZ 32% BD 4% Psychotic Disorder NOS	Outpatient	SAEQ CTS2 PCL	TR
Grubaugh et al. (2007)	USA	44	43.45 (9.68)	34.1%	SZ or SA	Outpatient ("two clinical programmes")	PCL	IC, CV
Jiang et al. (2018)	China (Chinese)	200	28.3 (5.9)	50%	ICD-10 SZ	Inpatient	CTQ-SF	IC, TR, HT
Kasznia et al. (2021)	Poland (Polish)	127	39.1 (13.8)	48%	33.1% FEP 66.9% Psychotic exacerbation during SZ or SA	Inpatient	CECA.Q	SV, IC
Kim et al. (2013)	South Korea (Korean)	100	37.8 (9.6)	41%	All SZ per DSM-IV SCID diagnosis	Outpatient 44 Inpatient 56	CTQ-SF	IC, TR, HT
		101	23 (3.4)	74%	Non-affective FEP	Outpatient	CTQ-SF	SV, IC, HT

(*continued on next page*)

Table 2 (*continued*)

Study	Location (Language if not English)	*N*	Age *M(SD); range*	Gender (% Male)	Diagnoses	Setting	Trauma Measure(s) Reviewed	Psychometric variable(s) assessed
Kongerslev et al. (2019)	Denmark (Danish)							
Paino et al., (2020)	Spain (Spanish)	114	35.5 (9.26); 14-52	71.9%	62.3% SZ 16.7% BPD 6.1% SA 6.1% BD/P 4.4% DD 2.6% SPD 1.8% STD	Outpatient	ExpTra-S	SV, HT
Penney et al., (2021)	Canada	65	39.78 (11.3); 19-61	56.7%	SZ or other psychotic disorder	Clinic specialising in psychological interventions for psychosis	PCL-5	SV, IC
Schäfer et al. (2011)	UK	38	31; *16-65*	40%	All psychosis, determined using data from SCAN	Outpatient	IES	IC, HT
Simpson et al. (2019)	Australia	54	19.87 (2.69)	64.81%	46% SPD 25% D/P 13% Psychotic Disorder NOS 8% BD/P 4% SZ 4% Substance-induced psychotic disorder	Outpatient	CTQ-SF	TR, HT
Sin et al. (2012)	Singapore	61	25.8 (6.6); 18.40	49.2%	42.6% SZ 13.1% SA 18% SPD 16.4% BPD 3.3% Psychosis NOS 6.6% Mood Disorder /P	Early Psychosis Intervention Programme	PSS-SR	IC, CV
Steel et al. (2017)	UK	165	41.85 (10.05)	71.5%	83% SZ 17% SA	Outpatient	PCL	CV
Styla and Makoveychuk (2018)	Poland (Polish)	30	48.7 (11.6)	63.34%	100% SZ	Outpatient	CEQ-58	IC, HT
Xiang et al. (2021)	China (Chinese)	35	17.91 (3.60)	42.86%	100% SZ	Inpatient, then Inpatient or Outpatient follow up	CTQ-SF	IC, TR

Note: *Diagnoses:* /P= with Psychotic Features; BD= Bipolar Disorder; BPD = Brief Psychotic Disorder; D= Depression; DD = Delusional Disorder; FEP = First Episode Psychosis; ICD-10 = International Classification of Diseases, 10th Edition; NOS = Not Otherwise Specified; SA = Schizoaffective; SCAN = Schedules for Clinical Assessment in Neuropsychiatry; SPD= Schizophreniform Disorder; STD = Schizotypal Disorder; SZ = Schizophrenia. *Trauma Measures:* CAPS-S = Clinician-Administered PTSD Scale for Schizophrenia; CECA.Q = Childhood Experience of Care and Abuse Questionnaire; CEQ-58 = Childhood Experiences Questionnaire – 58; CTQ-SF = Childhood Trauma Questionnaire – Short Form; CTS2 = The Revised Conflict Tactics Scales; ExpTra-S = Screening of Early Traumatic Experiences in Patients with Severe Mental Illness; IES = Impact of Events Scale; MCS = Maltreatment Classification System; PCL or PCL-S = PTSD Checklist for DSM-IV; PCL-5 = PTSD Checklist for DSM-5; PSS-SR = PTSD Symptom Scale – Self-Report; SAEQ = Sexual Abuse Exposure Questionnaire; SOTS = Symptoms of Trauma Scale; TALE = Trauma and Life Events Checklist; TEC = Trauma Experiences Checklist; TSQ = Trauma Screening Questionnaire. *Psychometric variables:* CV = Criterion Validity; HT = Hypothesis Testing; IC = Internal Consistency; IR = Inter-rater Reliability; SV = Structural Validity; TR = Test-Retest Reliability. *Exception of Psychotic Disorder due to General Medical Condition and Substance-Induced Psychotic Disorder. ^referred to in Choi et al. (2012) as 'Child Abuse Rating System'. # Median and Inter-quartile range (IQR) reported due to no M(SD) data available.

evidence' (GRADE) rating informed by methodological quality and consistency of psychometric evidence. Supplementary Table A.2 displays the study statistics on which ratings were based. Supplementary Table A.3 details risk of bias ratings and rationale for the overall quality of evidence ratings.

3.1. Methodological quality

No studies were excluded based on poor methodological quality. Notably all studies, except one (Paino et al., 2020), that assessed internal consistency were methodologically 'very good'. Similarly, criterion validity was measured consistently well across studies. Poorer quality was seen when structural validity was assessed, with three 'inadequate' methodology ratings, which were all due to sample sizes that were deemed too small based on number of items within the measure. Reliability had 'doubtful' ratings in most cases, which was due to statistical reporting (e.g., weighted kappa not reported for ordinal scores). For construct validity, quality was considered for each comparator measure (convergent validity) or sample (discriminative validity) reported within a study; 81.25% of ratings were adequate or higher for methodological quality.

Table 3
Overview of trauma measures.

Trauma Measure	Construct	Administration Method	Structure # of scales (# of items)	Scale	Scoring
Life Experience of Trauma Measures					
Childhood Experience of Care and Abuse Questionnaire (CECA.Q) (Bifulco et al., 2005)	Lack of parental care, parental physical abuse and sexual abuse from any adult pre-17	Self-rated	Three scales: PC (16) PA – screen (1), if 'yes' (4), 'no' (0) SA – screen (3), if 'yes' or 'unsure' (8), 'no' (0)	PC: 1 - 5 PA, SA: Y (1) / N (0)	No total score provided Subscales = Σ (items for each subscale)
Childhood Experiences Questionnaire (CEQ-58) (Styla et al., 2018)	Traumatic childhood experiences	Self-rated	7 subscales (58): PA (8), MA (8), PN (8), EN (8), SA (9), EI (9), NEP (8)	1 – 5	Total = Σ (all items) / 58 Subscales = Σ (items for each subscale) / number of items in scale
Childhood Trauma Questionnaire – Short Form (Bernstein et al., 2003); Chinese translation (Zhao et al., 2005); Dutch translation (Thombs et al., 2009); Korean version (Kim et al., 2011)	Historical childhood trauma	Self-rated	Five scales (28): PA (5), SA (5), EA (5), PN (5), EN (5).	1 – 5	Total = Σ (all items) Subscales = Σ (items for each subscale)
Maltreatment Classification System (Barnett et al., 1993)	History of child abuse	Clinician-rated	Six abuse domains (CSA*, CPA*, EM*, FTP*, LOS*, M-L/ED)	0-5	Total score = Σ (all items)
The Revised Conflict Tactics Scales (CTS2) (Straus et al., 1996)	Intra-family violence since age 16	Self-rated	5 subscales (39): PAs (12)*, PsA (8), Negotiation (6), SC (7)*, Injury (6)*	Occurred: since age 16 (1), in last year (2)	No total provided Subscales = Σ (items for each subscale)
Screening of Early Traumatic Experiences in Patients with Severe Mental Illness (ExpTra-S) (Paino et al., 2020)	Early traumatic experiences	Self-rated	2 subscales (36) Frequency (18) Distress (18)	Frequency: 0 – 3 Distress: 1 – 4 Only rated if frequency ≥1	Total = Σ (all items) Subscales = Σ (items for each subscale)
Sexual Abuse Exposure Questionnaire (SAEQ) (Rodriguez et al., 1997)	Childhood sexual abuse	Self-rated	1 scale (10)	Y(1) N (0)	Total = Σ (all items)
Trauma and Life Events checklist (TALE) (Carr et al., 2018)	Lifelong trauma screening	Self-rated or clinician-supported	1 scale (20): Events endorsed, Frequency >1 rated 3 additional items: If events affect now, which ones, how much affected	Y(1) N(0) 0-10 global impact	Total = Σ (items endorsed) Cumulative = Σ (items endorsed) + Σ (items where frequency >1)
Trauma Experiences Checklist (TEC) (Cristofaro et al., 2013)	Childhood and adolescence trauma screen	Self-rated	2 Scales (33): Factor A (14) Factor B (19)	Frequency endorsed 0,1,2,3,>3 (scored 0-4) or Y(1), N(0)	Total = Σ (all items)
PTSD/ Current Impact Measures					
Clinician Administered PTSD Scale for Schizophrenia (CAPS-S) (Gearon et al., 2004)	Current and lifetime PTSD symptomology	Clinician administered semi-structured interview and rate items	3 subscales (17): Rate frequency and intensity	0 - 4	Total = Σ (all items) Subscales (Avoidance, Arousal, Intrusive) = Σ (items for each subscale)
Impact of Event Scale (IES) (Horowitz et al., 1979)	Post-traumatic symptoms	Self-rated	2 subscales (15): Intrusion (7) Avoidance (8)	0, 1, 3, 5	Total = Σ (all items) Subscales = Σ (items for each subscale)
PTSD Checklist for DSM-IV (Blanchard et al., 1996)	Current PTSD symptomology	Self-rated	1 scale (17)	1 – 5	Total = Σ (all items)
PTSD Checklist for DSM-5 (PCL-5) (Weathers et al 2013)	Current PTSD symptomology	Self-rated	1 scale (20)	0 - 4	Total = Σ (all items) DSM-5 Symptoms Cluster (Criteria B-E) scores = Σ (items for each criterion)
PTSD Symptom Scale – Self Report (PSS-SR) (Foa et al., 1993)	Current PTSD symptomology	Self-rated	3 subscales (17): Reexperiencing (4) Avoidance (7) Arousal (6)	0-3	Total = sum of all items Subscales = sum of items for each subscale
Symptoms of Trauma Scale (SOTS) (Opler et al., 2004)	Current PTSD symptomology	Clinician administered semi-structured	4 symptom clusters (9): DSM-IV PTSD (3) Affect dysregulation	1 - 7	Total = Σ (all items) Composite scores = Σ items that align with

(*continued on next page*)

Table 3 (*continued*)

Trauma Measure	Construct	Administration Method	Structure # of scales (# of items)	Scale	Scoring
		interview and rate items	(1) PTSD Dissociation (1) cPTSD (4)		diagnostic category (e.g. cPTSD or DSM-5 PTSD)
Trauma Screening Questionnaire (TSQ) (Brewin et al., 2002)	Current PTSD symptomology	Self-rated	1 scale (10)	Y (1), N (0) Y = ≥ twice a week	Total = Σ (all items)

Note: Σ = sum of; cPTSD = Complex PTSD; CSA = Childhood Sexual Abuse; CPA = Childhood Physical Abuse; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; EA = Emotional Abuse; EI = Environmental Instability; EM = Emotional Maltreatment; EN = Emotional Neglect; FTP = Failure to Provide; LOS = Lack of Supervision; M-L/ED = Moral/ Legal/ Educational Maltreatment; MA = Mental Abuse; NEP = Negative Experiences with Peers; PA = Physical Abuse; PAs = Physical Assault, PC = Parental Care, PN = Physical Neglect, PsA = Psychological Aggression, SA = Sexual Abuse, SC = Sexual Coercion. *Subscales assessed in included study in this review.

Table 4
Psychometric quality and overall evidence quality ratings.

Measure	Language	Psychometrics (Terwee and Prinsen criteria(Prinsen et al., 2016; Terwee et al., 2007)						Overall Quality of Evidence (Modified GRADE)				
		IC	R	CV	SV	HT Conv	Discrim	IC	R	CV	SV	HT
CAPS-S	English	?	+	-		+		Low	Very Low	Low		Very Low
CECA.Q	English		?			+			Very Low			Low
	Greek		?			+			Very Low			Low
	Polish	+			+			High			Very Low	
CEQ-58	Polish	+				+		Low				Very Low
CTQ-SF	Chinese	+	±			+		High	Low			Moderate
	Danish	?			-	+		High			High	Low
	English	+	+			±		Low	Moderate			Moderate
	Korean	?	?			+		High	Low			Moderate
CTS2	English		?						Very Low			
ExpTra-S	Spanish	?			?	+		Very Low			Moderate	Low
IES	English	+				?	+	Low				Very Low
MCS	English		+			±			Moderate			Moderate
PCL	English	+	?	±				Low	Very Low	High		
PCL-5	English	+			?			Moderate			Very Low	
PSS-SR	English	+		+				Moderate		Moderate		
SAEQ	English		?						Very Low			
SOTS	English or Spanish	?				+		High				Moderate
TALE	English		-			+			Very Low			Very Low
TEC	English	+			+	+		High			Very Low	Very Low
TSQ	Dutch			+						High		

Note: CV = Criterion Validity; Conv = Convergent Validity; Discrim = Discriminative Validity; HT = Hypothesis Testing; IC = Internal Consistency; IR = Inter-rater Reliability; SV = Structural Validity; TR = Test-Retest Reliability. *? = indeterminate; += sufficient; -=insufficient;* ±=inconsistent. CAPS-S = Clinician-Administered PTSD Scale for Schizophrenia; CECA.Q = Childhood Experience of Care and Abuse Questionnaire; CEQ-58 = Childhood Experiences Questionnaire – 58; CTQ-SF = Childhood Trauma Questionnaire – Short Form; CTS2 = The Revised Conflict Tactics Scales; ExpTra-S = Screening of Early Traumatic Experiences in Patients with Severe Mental Illness; IES = Impact of Events Scale; PCL or PCL-S = PTSD Checklist for DSM-IV; PCL-5 = PTSD Checklist for DSM-5; PSS-SR = PTSD Symptom Scale – Self-Report; SAEQ = Sexual Abuse Exposure Questionnaire; SOTS = Symptoms of Trauma Scale; TALE = Trauma and Life Events Checklist; TEC = Trauma Experiences Checklist; TSQ = Trauma Screening Questionnaire.

3.2. Appraisal of psychometric properties

3.2.1. Reliability

Internal consistency. Full scale internal consistency was reported in 13 studies and ranged from .81 for the Childhood Trauma Questionnaire – Short Form (CTQ-SF), Chinese version, to .96 for the Screening of Early Traumatic Experiences in Patients with Severe Mental Illness (ExpTra-S). For two measures (Childhood Experiences of Care and Abuse Questionnaire (CECA.Q) and Trauma Experiences Checklist (TEC)), subscale internal consistency scores were provided.

Alpha levels were all in the acceptable range (Cronbach's $\alpha \geq .70$), however the one rating above .95 (ExpTra-S, $\alpha = .96$) was deemed to be outside this range and may indicate that some items are redundant (Terwee et al., 2007). For nine instruments, there was adequate internal consistency within the studies and evidence of structural validity available, either in the paper or the literature. For five measures (Clinician Administered PTSD Scale for Schizophrenia (CAPS-S), CTQ-SF Korean and Danish versions, ExpTra-S, Symptoms of Trauma Scale (SOTS)), while there was adequate internal consistency reported from the instrument scores, there was a lack of evidence for structural validity, meaning the findings were rated as 'inconsistent'.

Inter-rater reliability. Inter-rater reliability was reported in two studies. 'Sufficient' reliability ($\kappa \geq .70$) was determined from the study data for the CAPS-S and Maltreatment Classification System (MCS), both of which are clinician-rated.

Test-retest reliability. Two measures (CTQ-SF English version, CAPS-S) provided intra-class correlation coefficients (ICC) between .77 and .91, providing evidence of 'sufficient' test-retest reliability from the instrument scores. Other measures were rated as 'inconsistent' due to kappa not calculated, kappa calculated but not reported as weighted kappa, or correlation coefficients calculated without evidence of no systematic change. Nevertheless, studies that provided the kappa statistic would have been rated as 'insufficient' due to levels <.70. One study rating

three measures (Conflict Tactics Scale (CTS2), Sexual Abuse Experiences Questionnaire (SAEQ), PCL) utilised the gamma statistic (Goodman et al., 1999); this could not be rated against the guidance hence were rated as 'inconsistent'.

The Chinese version of the CTQ-SF was rated as 'indeterminate' due to conflicting psychometric statistics. One study's scores provided 'sufficient' evidence of test-retest reliability (Xiang et al., 2021) and the other provided correlational statistics without evidence of no systematic change (Jiang et al., 2018). Although, the former 'sufficient' value decreased to 'insufficient' levels (=.50) when follow up was longer than 12 months (Xiang et al., 2021).

3.2.2. Validity

Criterion validity. Five studies assessed criterion validity, whereby the instrument was assessed to see whether it reflected a 'gold standard' (i.e., whether it has similar results to a measure that has been determined to measure the construct well). One study compared the CAPS-S outcome to Structured Clinical Interview for DSM-IV diagnoses and was rated 'insufficient' (κ =.53). Comparing to the CAPS (standard version), PTSD Symptom Scale – Self-Report (PSS-SR) and Trauma Screening Questionnaire (TSQ) were found to have 'sufficient' validity from the test scores available. The PCL was rated as 'indeterminate' due to different ratings for psychometric quality of studies: one study provided 'sufficient' measurement properties based on the study data (Grubaugh et al., 2007), and the other only reported correlations which were rated as 'inconsistent' per COSMIN (Steel et al., 2017). Any studies purporting to assess criterion validity that did not use a 'gold standard' were instead classified as measuring convergent validity and were rated as such.

Structural validity. Five studies assessed structural validity. CECA.Q Polish version and TEC had 'sufficient' measurement properties in their corresponding studies, whereas ExpTra-S and PCL-5 were rated as 'inconsistent' due to not reporting necessary statistics. The Danish version of the CTQ-SF was rated as 'insufficient' due to not meeting the outlined statistical thresholds.

Construct validity. Construct validity consisted of convergent and discriminative validity. For 14 instruments, convergent validity was assessed. In most cases, hypotheses were evident, and the results were in line with them. For the Impact of Events Scale (IES), hypotheses could not be determined (Schäfer et al., 2011). The English CTQ-SF was rated as 'indeterminate': one study was 'sufficient' (Gayer-Anderson et al., 2020) and another did not have hypotheses (Simpson et al., 2019). The MCS was also rated 'indeterminate' as some results were in line with hypotheses, whereas others were not. Correlations for determining discriminative validity, which assesses validity of the measure between known groups, were available in one study. Differences between patients and controls were evaluated; a hypothesis was defined hence the study was rated as 'sufficient' (Schäfer et al., 2011).

3.2.3. Other Psychometric Properties

None of the studies reported other psychometric properties detailed within the COSMIN guidance. While three studies describe some aspects of developing a measure (Carr et al., 2018; Cristofaro et al., 2013; Paino et al., 2020), sufficient detail was not provided to be classed as content validity studies, therefore it was not rated or reported here.

3.3. Quality of the evidence

For overall evidence quality, 65% of evaluated measurement properties were rated as 'low' or 'very low'. As most measures only had one study assessing psychometric properties, the sample size often caused a reduction in quality rating due to imprecision. Risk of bias (methodological quality) also led to decreases in quality ratings, particularly for studies that assessed test-retest reliability. Nine psychometric properties were rated as 'high'-quality evidence, these were mostly ratings of internal consistency.

4. Discussion

This review found 24 studies evaluating 17 instruments which measure trauma in non-affective psychosis populations: nine assessed lifetime experience of trauma and seven measured current impact of trauma (i.e., PTSD symptomology). There was a lack of good quality evidence for psychometric reliability and validity from the data currently available in this population, with much of the evidence being low quality. However, this review summarised the information for the first time and provides an insight into the available measures, including some that have promising initial statistics. To aid interpretation, validity implies reliability but not vice versa (Furr, 2021). With limited psychometric evidence for each measure, we have recommended measures based on reasonable reliability or validity, though recognise that good validity measurement properties would imply a stronger instrument overall.

4.1. Lifetime experience of trauma measures

Nine measures assessed lifetime experience of traumatic events. They asked participants about the presence or absence of specific experiences, which could be deemed traumatic, in specific periods of their lifetime. Measures primarily assessed childhood experiences, potentially missing rich information from the rest of the lifespan. Seven measures were broad and asked about a spectrum of experiences, whereas the SAEQ and CTS2 were focused on specific types of traumas. Only one measure, the Trauma and Life Experiences checklist (TALE), assessed trauma across the lifespan and included psychosis-specific items.

The Childhood Trauma Questionnaire – Short Form (CTQ-SF) was the best performing of the measures reviewed, it was the only measure with multiple properties rated higher than 'low' quality. The CTQ-SF was evaluated both in English and other languages, using previously validated translated versions (Kim et al., 2011; Thombs et al., 2009; Zhao et al., 2005). We would anticipate temporal stability and therefore reliability in test scores for historical measures. Indeed the English version demonstrated good psychometric properties for internal consistency and reliability from available test scores, but the quality was rated as 'low' and 'moderate' respectively due to small sample sizes. With respect to feasibility of use in clinical settings, this measure may be more readily accessible than others given it is widely used across the world in clinical and research settings and has been validated in various samples (Georgieva et al., 2022). There would, however, be a benefit of further research regarding the psychometric properties of the CTQ-SF in larger samples. Regarding the translated versions, the evidence quality varied. The 'insufficient' structural validity ('high' quality evidence) of the scores from the Danish version affected the internal reliability of the scale, whereas structural validity was previously determined for the Chinese version hence a 'sufficient' internal consistency rating. Test-retest reliability appeared difficult to establish in the translated versions. Overall, the scale seems to have reasonable internal consistency across translations from the available studies, but further validation of other properties is recommended.

The only other measure that had reasonable evidence was the MCS. Along with the CTQ-SF English version, 'moderate' quality evidence for reliability was evident. An important caveat is that the MCS was rated from archival clinical record information as opposed to information provided by a patient or participant at the point of administration and scoring, therefore the elements of human error in reporting or social desirability that may be evident in patient-facing studies may be missing. It could also be argued that the MCS should not have been included as an instrument within this review, however the authors felt

the system still rated patient-reported information, albeit archival, hence the 'patient-reported' title can be loosely applied. Nonetheless, as there was no evidence for the instrument rating directly reported patient information, its use would not be recommended without further research. It would be useful to evaluate psychometric properties when the MCS is used to rate patient-reported information at the time of administration.

'Sufficient' structural validity was demonstrated for the TEC and CECA.Q Polish version based on the interpretation of available test scores, however the measures were limited by their overall COSMIN methodological quality rating. The 'worst scores counts' method meant that otherwise adequate assessment of structural validity was downgraded due to low sample sizes, an issue evident for several included studies.

The TALE is also a noteworthy instrument as this was the only measure that had psychosis-specific items. While the evidence for this measure is classified as 'very low' quality, it could be useful in clinical practice and research to identify if an individual's experience of psychosis or mental health/ related services has been traumatic. This important information is not captured with other measures. The 'low'-quality rating was due to only one study of adequate methodological quality being available and a small sample size. However, this measure was relatively recently published and could prove promising with further research.

It is noted that alongside PCL administration, Steel et al. (2017) assessed prevalence of 18 traumatic experiences the individual may have been exposed to, which included two items relating to psychiatric treatment and the experience of threatening psychotic experiences. Unfortunately, the psychometric properties were not assessed for this aspect of the scale, so it is not possible to comment on whether this is a suitable screening tool for lifetime traumatic experiences.

Other measures identified (CECA.Q English and Greek versions, CEQ-58, CTS-2, ExpTra-S, SAEQ, TEC) had poor quality evidence, often of 'indeterminant' psychometric quality based on the interpretation of instrument scores, hence it is difficult to recommend their use without further psychometric studies.

4.2. PTSD symptomology measures

Seven measures assessed current impact of trauma, asking participants to rate the presence of known PTSD symptoms. All the measures explicitly state links between items and DSM PTSD symptom clusters. The CAPS-S, PCL, and PSS-SR align with the DSM-IV. The TSQ items are derived from the PSS-SR and as such also align with the DSM-IV. The PCL-5 is an update of the PCL and aligns to DSM-5 PTSD criteria. The SOTS items can be grouped to account for DSM-IV PTSD, DSM-5 PTSD and Complex PTSD. The original IES was used in Schäfer et al. (2011); this was based on the DSM-III PTSD criteria and missed items pertaining to hyperarousal (Horowitz et al., 1979). One measure attempted to consider the complexity of distinguishing between psychotic experiences and PTSD symptomology. Gearon et al. (2004) integrated specific interview prompts "*to differentiate between psychotic processes that were obviously unrelated to trauma versus symptoms of PTSD (e.g. paranoid delusions vs. hypervigilance, hallucinations vs. flashbacks)*" *(p.122)*. This measure could have promise based on the psychometric data derived from the scores; however, it was only assessed in a small, all female sample.

Two measures had overall quality ratings that were 'moderate' or 'high' across multiple psychometric properties – the SOTS and PSS-SR. Of these, the PSS-SR would be most recommended due to 'sufficient' psychometric properties (based on the instrument scores) for internal consistency and criterion validity. The TSQ had 'high' quality and 'sufficient' evidence; this instrument is derived from the PSS-SR but a translated Dutch version was assessed in this review. The lack of evidence for structural validity of the SOTS affected its internal consistency rating, however this is noted to be >.70 in the study reviewed here.

The IES had some promising psychometrics, however the quality was downgraded due to only one study with a low sample size being available. The more recent, revised version of this scale (IES-Revised; Weiss and Marmar, 1997) was developed to be more in line with the current diagnostic understanding of PTSD and is still awaiting evaluation in this population. The IES-R could be more beneficial to validate than the original IES, which does not assess PTSD symptoms of hyperarousal.

Some of the most well-known of the symptomology measures are the PCL and PCL-5, for which the quality of evidence varied. The PCL was found to have 'high' quality evidence for criterion validity, however the psychometric rating was 'indeterminate' due to one study finding 'sufficient' evidence (Grubaugh et al., 2007), and the other finding 'insufficient' due to a correlation <.70 in their sample (Steel et al., 2017). This suggests that the PCL has potential for recognising PTSD in psychosis populations. The more recent iteration, PCL-5, had varied quality. The structural validity of the PCL-5 was rated as 'indeterminate' due to not reporting or describing statistical procedures sufficiently. It could be argued that the PCLs do not account for psychosis-related nuances in trauma but there is some evidence here of psychometric potential. Moreover, the measures are freely accessible and therefore, further evaluation could be seen as worthwhile on these merits.

4.3. Limitations

The COSMIN methodology provides clear criterion to determine quality (methodological and psychometric), enabling individuals without expertise in psychometrics to evaluate the overall quality of instruments. However, it does have significant limitations which affected the authors' ability to draw firm conclusions from this review. The conservative nature of the methodology has been acknowledged as leading to potential rejection of adequate instruments in other reviews (Justo-Núñez et al., 2022; Smith et al., 2021). The worst score counts principle (Terwee et al., 2012) is pragmatic but has implications for overall ratings, the methodological quality appears worse than if an 'average score' method were employed. Moreover, an issue the reviewers regularly faced was lack of detail within the published article. It is acknowledged that some studies may have met COSMIN requirements at the point of execution but lacked detail in reporting (likely due to word count constraints) that may have led to downgrading in quality.

Most studies within this review had small sample sizes, therefore how generalisable the results are in representing psychometric validity in the wider psychosis population is unclear. Overall quality ratings of several studies were downgraded on this basis. Other reviews raised similar difficulties (Smith et al., 2021), whereby small sample sizes meant that structural validity and in turn, internal consistency, cannot be properly evaluated using the COSMIN guidance. Reporting of kappa, similarly, may be affected by the criteria. If the data produced is nominal, unweighted kappa would be appropriate (Kottner et al., 2011), however the guidance only provides criteria for weighted kappa or ICC. Specific measurement properties based on the level of measurement (nominal, ordinal, continuous) would be useful.

Poor quality studies do not necessarily have to be excluded per COSMIN and we did not exclude any studies on this basis, although could have. Reliability and validity statistics are properties of the scores produced within these studies, therefore the generalisability of the results and recommendations derived from studies which may risk bias due to their methodologies is questionable. On the other hand, without compiling and reviewing the available literature, it would be challenging to determine which instruments may have promise and need to be appraised in more detail.

Furthermore, the criteria for this review led to some papers that incorporated more general serious mental illness cohorts (e.g., affective disorders) being excluded, which potentially excluded other interesting measures or additional information about psychometric quality of the measures presented here. A clear gap within the available measures is integration of elements specific to iatrogenic harm and the experience of

having serious mental illness. Such elements would be beneficial for understanding the nuances of PTSD in psychosis, and more generally mental health patient populations. It has previously been highlighted that further research is required to develop a reliable and valid instrument to measure psychosis-related trauma (Fornells-Ambrojo et al., 2016), which is echoed by the findings of this review.

4.5. Future Research

There were no studies retrieved that reported on content validity. Studies detailing development procedures and an assessment of content validity would be helpful to understand whether the items feel comprehensive, comprehensible, and relevant to psychosis patients (e.g., through interviews), particularly when considering the lack of integration of items that appraise psychosis-related trauma and iatrogenic harm. Moreover, further qualitative studies would enhance our understanding of what elements of care and psychosis symptoms need to be quantified in future measures.

Outcome measures attached to interview schedules may be more labour intensive and it is unclear whether they could function as standalone self-report measures, without the attached clinician-led interview. Further research into the usefulness of clinician-rated measures compared to self-rated measures would be helpful in considering what instruments can be best utilised in clinical practice to enhance patient care.

Further research is evidently required for all measures detailed within the current review. There is a significant amount of internal consistency data, but this is a low bar for determining reliability. Moreover, the lack of test-retest reliability information for historical reports of trauma is problematic and raises the question of whether illness-related factors (e.g., paranoia) could affect reliability of reporting. Studies that assess multiple psychometric variables (including properties not evaluated yet, such as cross-cultural validity, responsiveness) in larger samples, in both outpatient and inpatient settings, that include a range of schizophrenia-spectrum diagnoses would be ideal to contribute to a more comprehensive evaluation. However, for smaller studies, the focus should be on validity, given that reliability can be inferred (Furr, 2021). It is essential to consider: is this representation of the construct and method of assessment valid in psychosis populations. Future psychometric study quality could be enhanced by using the COSMIN guidance as a framework for study design and reporting.

5. Conclusions

This review has for the first time critically examined the psychometric properties derived from studies with psychosis population for a range of trauma measures. A useful resource has been compiled for selecting trauma measures that could be used with psychosis populations, in clinical practice or in research settings. Moreover, the limitations of COSMIN as highlighted above may have affected the overall quality ratings and led to some measures being categorised as 'low' quality. Hence, the recommendations made are tentative in nature.

Considering instruments that assess lifetime experience of trauma, the CTQ-SF has the most robust evidence and is available in several translations. The TALE, as the only measure integrating items that cover psychosis-related trauma and iatrogenic harm, could be considered as a screening tool but would benefit from further evaluation. Regarding current impact measures, the SOTS, PSS-SR and TSQ showed the highest quality evidence. The more readily available PCL and IES can be used with this population, but the quality of the evidence varies. Further validation of the most recent versions (PCL-5 and IES-R) is necessary.

Psychosis-specific trauma and responses require further investigation and integration into future measures, preferably whilst utilising the COSMIN framework when designing and evaluating these in the future. While further validation of existing measures would be beneficial and recommended, the instruments detailed here may be useful to enhance assessments of trauma history and its impact in psychosis patients.

Data availability statement

Data sharing is not applicable to this article as no new data were created or analysed in the study. COSMIN guidance and criteria is freely accessible online at cosmin.nl.

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CRediT authorship contribution statement

Nicola D. Airey: Conceptualization, Methodology, Data curation, Formal analysis, Writing – original draft. **Christopher D.J. Taylor:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Anvita Vikram:** Validation, Writing – review & editing. **Katherine Berry:** Conceptualization, Methodology, Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

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