School of Psychology
Ysgol Seicoleg

An empirical study validating a measure of service support for CBT and a systematic review of the prevalence of co-occurring Post-traumatic Stress Disorder and Obsessive-Compulsive Disorder

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Table of Contents

Preface

The following large-scale research project (LSRP) comprises of two papers which are thematically distinct. The first half of the LSRP presents an empirical paper which validates a measure of service support for Cognitive Behavioural Therapy (CBT). The second paper is focused on establishing the prevalence of co-occurring PTSD and OCD.

Both papers are unrelated to an initial LSRP project planned in 2018-19, which fell through due to service issues. A second empirical project was designed which focused on predictors of therapist competence and NHS ethical approval and sought to recruit practitioners delivering CBT for PTSD as part of a randomised controlled trial. This project used a novel measure of service support for CBT. This measure had not been previously validated and as a result preliminary tests of validity were embedded within the study design.

As a result of delays in NHS ethics and recruitment for this project, a third study was designed, which focused primarily on the validation of this measure. This study was approved by Cardiff University's ethics committee. The systematic review was devised when the second project was in preparation, and as a result is thematically linked to PTSD.

CBT has become more widely available to the public through the National Health Service (NHS).. The evidence-base for the effectiveness of CBT is extensive and is predicated on the availability of supports for therapists. The degree to which the delivery of CBT is supported by appropriate infrastructure and resource is not yet clear.

The first paper aims to address this issue through validating a measure of service support for CBT. An existing measure is reviewed by a panel of experts before being piloted with a diverse sample of CBT therapists. The resulting measure is shorter and is comprised of six thematically distinct components: access to physical resources; suitability of the clinical environment; clinical supervision; time to offer flexible sessions and prepare; working

outside the clinic; professional development. It has demonstrated good content validity, temporal stability and internal consistency. Construct validity is demonstrated through positive correlations with work engagement and practitioner wellbeing. Therapist recruitment stalled during the development of the COVID-19 pandemic and a smaller sample was recruited than planned.

The study confirmed that the measure is a valid and reliable index of service support and extends the application of the Job-Demands-Resources (JDR) model (a model of occupational stress) to CBT practitioners. The JDR model suggests that job resources stimulate work engagement which in turn predicts positive organisational outcomes such as work performance. The study confirmed that support for the delivery of CBT was associated with better engagement with work and greater practitioner wellbeing. Future research may therefore wish to address whether job resources can influence practitioner competence or clinical outcomes.

The second paper is focused on establishing the prevalence of co-occurring PTSD and OCD. Information available to the public indicates that PTSD and OCD commonly co-occur. However, it is not clear whether this is supported by high quality research evidence. Related systematic reviews have indicated that trauma may lead to the development of OCD, with some authors suggesting that the presence or absence of PTSD is not relevant.

This review therefore aimed to clarify the prevalence of co-occurring OCD and PTSD through a systematic review of the literature. A broad search strategy was devised, and four relevant databases were searched. Data was extracted from twenty-five relevant articles, which were quality assessed and reviewed.

This review highlighted that there are few studies which address this research question. Most report rates of co-morbidity across multiple psychiatric disorders. As a result,

most studies recruit samples which are too small to estimate the prevalence of co-occurring PTSD and OCD specifically. Furthermore, significant methodological differences across studies make it difficult to compare across groups and a wide range of current and lifetime prevalence rates are reported.

The review suggested that some populations may show higher rates of co-morbidity, including those accessing specialist treatment, women and veterans. Some studies indicated that OCD is more prevalent among those with diagnoses of PTSD than those with an experience of trauma (but no PTSD). Several studies indicate that a majority of people develop OCD after PTSD, and that this group may also experience more severe symptoms.

Both reviews make contributions to clinical practice. The first paper refines and validates an index of service support for CBT which may be used for clinical audit and service development. It also suggests that service providers concerned with employee engagement and wellbeing may look to workplace resources to support staff. The second paper indicates that specific groups may be more vulnerable to developing co-morbid PTSD and OCD and require a thorough assessment to inform treatment planning.

The papers are prepared for different journals: ‘Cognitive Behavioural Therapy’ and the ‘The Journal of Anxiety Disorders’.

Service support, work engagement and psychological wellbeing: Validating an index of resource and infrastructure support for the delivery of CBT

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Service support, work engagement and psychological wellbeing: Validating an index of resource and infrastructure support for the delivery of CBT

Cognitive Behavioural Therapy (CBT) has become more widely available in the UK since the publication of The Layard Report. To facilitate effective dissemination of CBT, competencies, skills and activities have been clearly defined and validated scales are used to measure therapist competence and adherence . To date, there is no validated measure of the resource and infrastructure support therapists receive within their services, to enable the delivery of CBT in line with best practice. As a starting point, this study took an existing questionnaire developed by Groom & Delgadillo (2012) and aimed to establish its psychometric properties through expert review and a pilot study. This resulted in a shorter questionnaire with good content validity. The index is comprised of six components and demonstrated good internal consistency (α=0.80) and temporal stability (r=0.74,p<.00). Construct validity was demonstrated through positive correlations with measures of work engagement (r=0.31,p<.00) and practitioner wellbeing (r=0.47,p< .00). The questionnaire provides a valid and reliable index of service support for delivering CBT in line with best practice and was found to be positively related to engagement and wellbeing among CBT practitioners.

Keywords: Cognitive Behavioural Therapy; Infrastructure; Resource; Scale Validation; Work Engagement; Practitioner Wellbeing

Introduction

Background

Cognitive Behavioural Therapy (CBT) is a time-limited and goal-oriented psychological therapy and a first-line treatment for anxiety and/or depression (NICE, 2011). CBT and other evidence-based psychological therapies have become more widely available in the United Kingdom (UK) since the rollout of Improving Access to Psychological Therapies (IAPT) initiative in 2008. Layard & Clark, (2014b, 2015) made the economic and humanitarian case for IAPT, proposing that the cost of delivering effective psychological therapies would be offset by savings in health and welfare.

The UK government have since invested over £1 billion on a service model which widens access to psychological therapies for people with mild to moderate anxiety and depression in England. Approximately 16% of the community population in England now accesses evidence-based psychological therapies, compared with fewer than 5% in 2007 (Layard & Clark, 2015). Although the same service model has not been adopted in Wales or Scotland, the provision of evidence-based psychological therapies (EBPT) has been endorsed within the Scottish Matrix, the Matrics Cymru, (Public Health Wales, 2017) and within Welsh policy (Welsh Assembly Government, 2012; 2019).

Research Therapy and Routine Clinical Practice

The effectiveness of CBT is evidenced in Randomised Controlled Trials (RCTs) which represent the 'gold-standard' of research evidence informing the development of clinical guidelines (NICE, 2004a, 2004b, 2005a, 2005b, 2006, 2009a, 2009b, 2011). In RCTs, any contextual factors hypothesised to influence outcome (for example therapist training or supervision) are tightly controlled or monitored to assure that clinical outcomes can be

attributed to the therapeutic intervention. It is arguable that EBPTs are those which approximate the interventions delivered in RCTs (Groom & Delgadillo, 2012). However, real-world clinical practice is not subject to the same control or monitoring processes (Cook, Schwartz, & Kaslow, 2017).

The CBT competence framework describes the competencies, skills and activities required for the effective delivery of CBT (Roth & Pilling, 2008). It was developed through concrete specification of the competencies described in large-scale RCTs underpinning clinical guidelines (Roth & Pilling, 2008). A detailed description of competencies enables commissioners and clinicians to define and monitor the service delivered (Groom & Delgadillo, 2012). Roth & Pilling, (2008) argue that activities and competencies are not separable from the infrastructure and resources which support their delivery, yet these factors are not incorporated into the competency framework.

Resources and Infrastructure Support for Psychological Therapists

Job resources are any workplace characteristics which (1) support staff in achieving their goals (2) reduce the demands and costs associated with the work or (3) stimulate employee growth and development (Demerouti et al., 2001). As such, staff who are supported with more resources perform better at work and experience greater wellbeing (Nielsen et al., 2017). Staff working in the National Health Service (NHS) often cite limited resources as a key challenge (Quirk et al., 2018). In line with the wider literature, the NHS Staff Survey found that insufficient job resources were negatively related to all aspects of workplace wellbeing (Teoh, Hassard, Cox et al., 2020).

The Job-Demands-Resources (JDR) model provides a framework for understanding the link between job resources and a range of personal and organisational outcomes

(Demerouti et al., 2001). The authors theorise that an abundance of job resources stimulate engagement with work. Work engagement is predicted exclusively by job resources and can be defined as "a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption" (Schaufeli et al., 2002, p. 74). It is proposed to mediate a relationship between job resources and positive organisational outcomes (Schaufeli & Bakker, 2004).

The model has been tested across several population samples, and a robust association (r=0.25-0.40) established between job resources and work engagement (Schaufeli & Bakker, 2004; Schaufeli & Taris, 2014). Further tests of the model have indicated that job resources and work engagement are important predictors of a wide range of organisational outcomes. Job resources stimulate work engagement which predicts (1) how employees feel about their workplace (or organisational commitment, Meyer & Allen 1991) (2) whether they intend to leave (turnover intention) (3) job strain and (4) burnout - a sense exhaustion, cynicism, and detachment which can arise among professionals working with people (Boyd et al., 2011; Hakanen et al., 2008; Maslach, 1998; Schaufeli & Bakker, 2004).

Job resources have been shown to be even more important under stressful conditions as they boost work engagement when job demands are high (Bakker et al., 2007). Relationships among job resources, burnout, job satisfaction and turnover intention have been observed among mental health professionals (Scanlan & Still, 2019). These relationships are of particular relevance to providers of psychological therapies, given the high rates of burnout reported among IAPT practitioners (Westwood et al., 2017).

The IAPT initiative has tripled the proportion of the English population accessing psychological therapies in under ten years (Layard & Clark, 2015) and may be the world's largest programme of its kind (Clark et al., 2013). The availability of resources and

infrastructure can be difficult to ensure during the rapid roll-out of large-scale service change. As such, it is likely that practice differs between service delivery systems and it is possible that, in some cases, daily operations may not reflect the original intentions of service designers (Black et al., 2018). For example, resource limitations have prompted some restrictions on delivery, such as limiting the course of therapy to an arbitrary number of sessions (Clark, 2018). Initial analyses of IAPT outcome data indicate that organisational factors account for some variability in clinical outcomes between services (Clark, 2018).

The availability of resources and infrastructure supporting CBT practitioners may facilitate or inhibit the delivery of an evidence-based intervention. Key resources supporting CBT practitioners are exemplified within key RCTs and model-specific treatment protocols. For example, the treatment of social phobia requires access to recording equipment (Clark et al., 2005) and the treatment of PTSD may require access to the internet to use Youtube or Google maps (Murray et al., 2015). Other protocols require some flexibility in service provision, in order to facilitate increased frequency or duration of sessions (Beck et al., 1979) or work outside the clinic (Ehlers & Clark, 2000). Furthermore, therapists delivering CBT in high quality RCTs will receive dedicated training as well as regular, high quality, model-specific clinical supervision (Roth et al., 2010).

In conclusion, although CBT has become more widely available across the UK it is not clear whether resources supporting the delivery of CBT in line with the evidence base have been widely incorporated into service delivery models. These resources are important for fidelity to the evidence base and for practitioner wellbeing and engagement. As such, a way of measuring and evaluating service infrastructure and resource for CBT is required.

Measuring Service Support for CBT

Groom and Delgadillo (2012) reviewed key guidelines supporting practice in IAPT services including (1) exemplar RCTs (Roth & Pilling, 2010), (2) the IAPT competency framework (Department of Health, 2007;Roth and Pilling, 2008) and (3) the BABCP Standards of conduct, performance and ethics (British Association for Behavioural and Cognitive Psychotherapies, 2010) in order to develop a novel measure of service support for CBT. Groom & Delgadillo (2012) idendified resouces or supports which were (1) reccomended within the IAPT competency framework, (2) available to therapists within exemplar RCTs or (3) required in order to adhere to the BABCP standards of conduct, performance or ethics.

As a result of this process Groom & Delgadillo (2012) developed a detailed and concrete description of key support factors which facilitate the competent delivery of CBT. Twenty-three support factors were identified, which were grouped thematically under seven standards and adapted into a questionnaire (Appendix 1). This questionnaire was piloted in one service to identify strengths and gaps in service support for CBT (Groom & Delgadillo, 2012). Haddon, Groom & Waddington (2018) later used the audit questionnaire to benchmark support for the effective delivery of CBT in one health board in Wales.

Aims

This study aims to establish the psychometric properties of the questionnaire developed by Groom & Delgadillo (2012) to determine whether this is a reliable and valid measure of service support for CBT. A validated measure of service support for CBT would enable services delivering CBT to measure the support provided to practitioners and facilitate the benchmarking of service provision and service improvement. In the absence of a ‘gold-

standard' measure with which to establish criterion validity, this study aims to establish construct validity by exploring the association between a measure of service support with measures of engagement and wellbeing among CBT practitioners in line with the JDR model (Demerouti et al., 2001; Schaufeli & Bakker, 2004).

Hypotheses

This study is split into two stages: (1) an evaluation of content validity and (2) psychometric evaluation. In stage one it is hypothesised that:

- Consensus feedback from the expert panel may result in adaptations to improve the content relevance and representativeness of the questionnaire.
- The content validity of the questionnaire will be evidenced by Content Validity Index (CVI) and Content Validity Ratio (CVR) scores above established thresholds (Wilson, Pan & Schumsky, 2012; Davis, 1992).

In stage 2 it is hypothesised that:

1. Principal Component Analysis (PCA) will identify one or more components with an eigenvalue of above 1.
2. A PCA will reduce the number of items required within the measure.
3. The questionnaire will demonstrate internal consistency, as measured by Cronbach's Alpha.
4. The questionnaire will demonstrate good temporal stability as indicated by a positive correlation between administration at time 1 and time 2 (7-14 days later).
5. The questionnaire will demonstrate construct validity through positive correlations with the following scales:

a. The Utrecht Work Engagement Scale.

b. The Psychological Practitioner Workplace Wellbeing Scale.

Methods

Procedure

The study was conducted in two stages. In order to ensure that the questionnaire adequately measures the domain of interest (i.e. is content valid), early consultation with experts is recommended (Vogt et al., 2004) for new and existing measures (Brod et al., 2009). In the first stage the questionnaire was subject to consultation and review by an expert panel. The questionnaire was then amended on the basis of the expert panel's feedback, and distributed to a sample of BABCP accredited practitioners, in order to further assess content validity (Stage 1). In the second stage, the questionnaire was distributed more widely for psychometric evaluation (Stage 2).

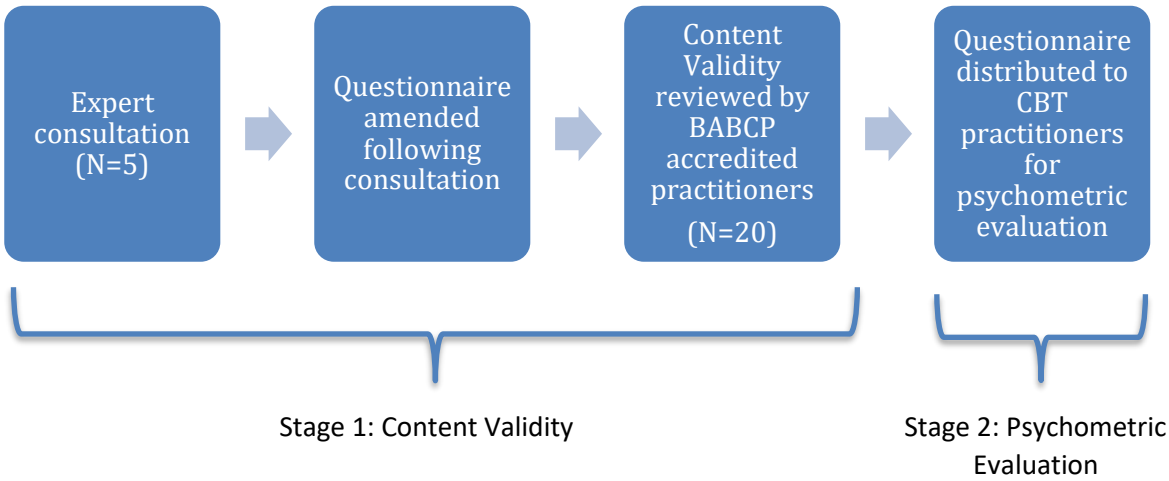

Figure 1. Flow diagram depicting the different stages of the procedure

Stage 1: Content Validity

Measures

Members a panel were asked to rate each item according to relevance (1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = very relevant) and necessity (1 = not essential, 2 = useful but not essential, 3 = essential) in measuring service resource and infrastructure support for CBT. These ratings were used to calculate the Item and Scale Level Content Validity Indices (I-CVI/S-CVI) and Content Validity Ratio (CVR) using the following approaches (Rodrigues et al., 2017; Zamanzadeh et al., 2015):

- I-CVI = The number of 'very relevant' ratings divided by the number of experts.
- S-CVI = The mean average of I-CVI scores.
- CVR = Initially subtracting the number of half of the raters (N/2) from the number of participants indicating their item is 'essential'(Ne), then dividing this by half the number of raters (N/2), or following this formula: CVR = (Ne – n/2) / N/2).

Sample

Assessments of content validity should include 'expert' opinion and potential users of the scale (Boateng et al., 2018; Vogt et al., 2004). In order to minimise chance agreement, at least five raters should assess content validity (Zamanzadeh et al., 2015) although the recommended number of raters ranges from 2-20 (Armstrong et al., 2005). An initial expert panel of BABCP accredited practitioners involved in teaching and training CBT were consulted and asked to evaluate the content validity of the questionnaire (N=5) and a further 15 BABCP accredited practitioners reviewed the questionnaire online using the content validity survey.

Procedure

The expert panel of BABCP accredited practitioners involved in teaching and training CBT were introduced to the questionnaire and its domain of measurement and were asked to rate each item according to its relevance and essentiality to the construct in question (service infrastructure and resource support for the delivery of CBT). The panel members were invited to comment on individual items within the questionnaire and discuss any aspects of the construct were not captured by existing items (DeVellis, 2016). Following the consultation, adaptations were made to the questionnaire (see results section) and it was distributed to a further 15 BABCP accredited practitioners for online review of item relevance and essentiality to the construct.

Stage 2: Psychometric Evaluation

Sample

Health professionals delivering CBT were invited to participate online. Participants were excluded if they did not work as part of a service.

Sample Size

For correlational analyses, a sample size of 84 is required to detect a small-moderate effect (0.3), and a sample size of 191 is required to detect a small effect (0.2, Cohen 1988). These estimations were calculated using GPower (Faul et al., 2007). Sample size estimations are not suitable for principal components analyses (PCA), though several 'rules of thumb' exist with respect to sample size requirements (Tsang et al., 2017). Some indicate a minimum number of participants per item, ranging from 5 to 30 (Comrey & Lee, 2013; Nunnally, 1994;

Pedhazur, 1997) while others outline absolute minimum values (Comrey & Lee, 2013). Ultimately, the suitability of PCA is dependent on the strength of the relationships between items and whether factors are well determined (Tabachnick et al., 2007). A majority of studies performing PCA or factor analyses do so with a participant to item ratio of up to 10:1 (Costello & Osborne, 2005). In line with previous research, this study aimed to recruit 230 participants, at a participant to item ratio of 10:1.

Recruitment

The study was advertised online on Facebook groups for clinical psychologists and CBT therapists. It was also advertised to staff and current and past students from CBT and Clinical Psychology Training Programmes at Cardiff University and other academic programmes. CBT therapists who have elected to make their details public on the UK CBT BABCP Register were notified by email about the study. CBT therapists delivering face to face therapy as part of the RAPID trial at Cardiff University were also contacted and invited to participate. The RAPID trial is a 'RAndomised controlled trial of a Trauma-Focused Guided Self-Help Programme versus InDividual Trauma-Focused Cognitive Behavioural Therapy for Post-Traumatic Stress Disorder'.

Measures

a. *Demographic and Training Questionnaire (Appendix 3)*

Participants were asked about their age, gender, profession, service context, training and occupation.

b. *CBT infrastructure and support questionnaire (Groom & Delgadillo, 2012; Appendix 1)*

The questionnaire under review contained 23-items measuring resource and infrastructure support for CBT, organised under seven standards.

c. Utrecht Work Engagement Scale (UWES) (Schaufeli & Bakker, 2004) (Appendix 4)

The UWES is a 17-item measure of work engagement (Schaufeli et al., 2002) which measures three dimensions of engagement; dedication, vigour and absorption. The internal consistency of sub-scales (over 0.8) and the composite scores is good (over 0.9) (Shaufeli, 2012). The UWES demonstrates discriminant validity through a negative relationship with burnout (Schaufeli & Bakker, 2004; Schaufeli et al., 2002). The authors endorse a three-factor structure (Shaufeli, 2012) yet high inter-correlations between factors have prompted others to use the total score as a composite measure of engagement (Christian & Slaughter, 2007).

d. Psychological Practitioner Workplace Wellbeing Measure (PPWWM) (Summers, Morris, Bhutani, 2019) (Appendix 5)

The PPWWM is a 26-item measure of the wellbeing of psychological practitioners specifically. It has demonstrated good construct validity through a positive relationship with the Satisfaction with Life Scale and negative relationship with the General Health Questionnaire. It has also demonstrated high internal consistency ($\alpha = .92$) and high temporal stability (r=.94) (Summers, Morris, Bhutani, 2019).

Ethical Issues

Ethical approval was sought from the Cardiff University School of Psychology Ethics Committee (EC.19.09.10.5689A) to recruit therapists via the BABCP register, Facebook and Universities. NHS ethical approval was obtained to contact therapists on the RAPID trial (IRAS reference: 216979).

Incentives

Participants were offered the chance to win £100 of vouchers for taking part.

Data Collection and Storage

Data was collected using Qualtrics, secure online survey software. Participants provided their email addresses for the purpose of follow-up contact and generated their own ID code. Identifiable information was held separately from the data and deleted after the study was completed. Questionnaire items, except for demographic and training questions, were administered in a 'forced-response' setting to minimise missing data.

Data Analysis

A Principal Components Analysis (PCA) and correlational analyses were conducted using two statistical software platforms: SPSS (IBM Corp, 2015) and FACTOR (Lorenzo-Seva & Ferrando, 2006).

Analysis

The analysis was conducted in two stages. In the first stage, amendments were made to the questionnaire following expert review. Content validity scores were then calculated based on ratings provided by the expert panel and BABCP accredited practitioners (N=20). In stage two, the psychometric properties of the measure were established through analysis of questionnaire data provided by practitioners delivering CBT (N-188). This stage comprised of an analysis of demographic variables and item analysis before a Principal Components Analysis (PCA) was conducted in order to establish the underlying structure of the questionnaire. As a result of the PCA, items were removed from the questionnaire. Measures of reliability and validity were taken for the revised questionnaire.

Principal Components Analysis (PCA) and Exploratory Factor Analytic (EFA) procedures are commonly used in the initial stages of questionnaire validation (Tabachnick et al., 2007). PCA and FA are distinguished by underlying mathematical processes and theoretical assumptions (Field, 2018). FA procedures assume that underlying factors cause or produce scores on individual items. A FA is therefore suitable for determining the structure of a scale which measures an underlying latent variable. PCAs do not rest upon this assumption and as a result is suitable for validation of indices whose scores are not driven by an underlying latent variable (Tabachnick et al., 2007, p.662-663). The current paper seeks to validate an index, and as a result a PCA was conducted.

PCAs and EFAs are applied in the initial stages of scale validation. When there is a hypothesis or theoretical basis for asserting that underlying factors are driving scores on items a Confirmatory Factory Analysis (CFA) may be conducted (Tabachnick et al., 2007). Although the questionnaire is structured thematically, the structure is not theoretically grounded, and as such a PCA was carried out rather than a CFA.

Results

Stage 1: Content Validity

Amendments

Following consultation with a panel of experts, minor amendments were made to the questionnaire, including adding 'don't know' options to four items (1a,4b,5d,5e). The wording of item 2b was clarified to indicate that 'bi-weekly' means 'twice-weekly'. Two additional questions were added under standard 2:

> 2c. Does your service allow for an extended number of sessions if required, in line with NICE guidance?
>
> 2d. Does your service allow for you to see a client in 6-8 months' time for a 'booster' session, in line with NICE guidance?
>
> These amendments were made prior to online distribution.

Content Validity Ratings

A further 15 BABCP accredited practitioners completed content validity ratings. CVI and CVR scores range between 1 and -1 with higher scores indicating greater agreement between raters as to the essentiality (CVR) or relevance (CVI) of an item. Wilson et al. (2012)'s critical values table was consulted in order to determine whether agreement on the essentiality of an item (CVR value) was great enough to exceed chance (Lawshe, 1975). For CVI scores, Davis (1992) recommends that agreement should surpass 0.8. Further to this, items scoring between 0.7-0.79 were considered to require revision and items below 0.7 were considered for elimination (Zamanzadeh et al., 2015).

According to these standards, agreement among raters as to how essential eight items were to the construct did not exceed chance (2d, 3a, 4a, 4c, 5d, 5e, 6b, 6c). All items met Davis's (1992) criteria for relevance, except for (5e) which had a borderline value. The full scale CVI was over 0.9 indicating a high level of agreement that items were relevant for measuring resource and infrastructure support for the delivery of CBT.

[Insert Table 1 Here]

Stage 2: Psychometric Evaluation

In total, 325 individuals accessed the survey and consented to participate. An initial screening question re-directed 58 participants from the questionnaire, because they indicated they did not work as part of an organisation. Participants who failed to complete the main support questionnaire were removed from analysis (N = 78). One hundred and eighty-eight participants were included in the final sample. Using GPower (Faul et al., 2007) it is calculated that the sample achieved a power of 0.79 to detect a correlation of 0.2, with the alpha value set at 0.05.

Participant Characteristics

Demographic information is contained in Table 2. Three quarters of respondents were female (74.5%) and over half worked in Wales (51.6%). Most respondents were CBT therapists (29.3%), trainee clinical psychologists (26.6%) or qualified clinical psychologists (21.3%). BABCP accredited CBT therapists made up 34.6% of the sample while a further 54.3% were working towards accreditation. Most respondents used CBT in adult mental health settings, including primary (28.2%), secondary (15.4%) and specialist adult mental health teams (29.3%) and 11.7% of participants were recruited from child settings.

[Insert Table 2 Here]

Demographic Variables

In order to determine whether participant characteristics might contribute to variation in the questionnaire's scores, Kendell's Tau-b (ŧb), Eta, and one-way ANOVA analyses were carried out. A ŧb test indicated there was no significant association between participant age and scale score (ŧb = 0.054, p=.28). Eta analyses and one-way ANOVAs indicated that there was no significant association between any nominal characteristic (e.g. Gender, service type, country, profession, enrolment on training programme, BABCP accreditation) and questionnaire score. The only item to approach a standard threshold ($\alpha = 0.05$) for statistical significance in a one-way ANOVA was BABCP accreditation status. However, a Bonferroni correction was made to account for multiple comparisons ($\alpha = 0.05 \div 8 = 0.006$) and as a result BABCP accreditation status (accredited or not accredited) was not found to account for variation in questionnaire scores.

[Insert Table 3 Here]

Item Analysis

An overall summary of scale characteristics is shown in the table below.

[Insert Table 4 here]

Table five provides further information about individual items. The item-total correlations (correlations between each item and the total score excluding that item) were low to moderate, ranging from .107 (5e) to .594 (4c). Two items scored below 0.2 (5e and 1c), five under 0.3 (2a, 2c, 6b, 7b, 7c) and three items scored above 0.5 (4c, 5a 4a). Item mean and standard deviation (SD) scores were evaluated. All item responses ranged from 0 to 2. Floor and ceiling effects may be indicated by scores below 1 or above 2 with small SDs. Only four items had means under 1 (3a,4a,5e,6c) with the lowest at 0.744 (5e) and a minimum SD of 0.84.

A review of the Pearson inter-item correlation matrix (Appendix 7) indicated that four items (1c, 2d, 5d, 6c) did not correlate with any other item ($R<0.3$) although one of these (6c) had an item-total correlation of above 0.3. A further review of a polychoric correlation matrix (Appendix 10) confirmed low inter-item correlations among these items, except for 1c. Polychoric correlations are described further in the next section. Three items were removed from further analysis (2d, 5d, 5e) due to low inter-item and item-total correlations.

[Insert Table 5 here]

Principal Components Analysis

A Principal Components Analysis (PCA) with orthogonal rotation (Varimax) was conducted to determine the component structure of the measure. Within traditional statistical packages (such as SPSS) PCAs are based on Pearson correlations. Some have argued that PCAs on ordinal data (or in data which is skewed or has strong kurtosis) should be conducted using polychoric correlations (Baglin, 2014; Basto & Pereira, 2012). These are correlations which estimate the unobserved continuous relationship underlying ordinal data (Basto & Pereira, 2012).

In practice, Pearson correlations are frequently used within PCAs and factor analyses of ordinal or likert-scale data (LaVeist et al., 2009; Summers et al., 2019). For the purposes of this study, PCAs were conducted based on both pearson and polychoric correlations, derived using a combination of SPSS and FACTOR programmes. Both analyses were conducted to establish confidence in the resulting component structure (Grace-Martin, n.d.). Initial assessment of the polychoric correlation matrix indicated that this data did not meet the assumption of sampling adequacy required for further interpretation. Results based on Pearson correlations are reported here, and the polychoric results can be seen in Appendix 13.

A PCA relies on assumptions of sampling adequacy and the suitability of the data for reduction. The Kaiser-Meyer-Olkin (KMO) statistic indicated satisfactory sampling (0.724) (Kaiser & Rice, 1974). All individual items had a KMO score of above .602, surpassing the minimum threshold of 0.5 (Kaiser & Rice, 1974). Bartlett's test of sphericity (P=0.00) indicated the data was suitable for data reduction, and the determinant indicated (0.003) that the data was not affected by multicollinearity.

The PCA was conducted on 22 items. 'Don't Know' responses comprised 0.53% of the recorded values (21 responses across two items: 1a and 4b). These responses were subject

to a pairwise deletion process to minimise the impact on statistical power (Van Ginkel et al., 2014).

The rotation method was selected following preliminary analyses using orthogonal (Varimax) and oblique (Direct Oblim) methods (Field, 2013). Inspection of the component correlation matrix following oblique rotation demonstrated negligible correlations between components, indicating that an orthogonal rotation method would be suitable (Pedhazur & Schmelkin, 1991).

A PCA using varimax rotation generated six components explaining 58.32% of the variance (Table 6). The scree plot (Appendix 12) (Cattell, 1966) and Kaisers criterion (Kaiser, 1970) can be consulted when choosing the number of factors to extract. However, a review of scree plots is reliable only for samples above 200 (Sevens, 2000) therefore in this study the Kaiser criterion was applied. The residuals matrix indicated that the rotated matrix was an adequate fit, with 32% of nonredundant residuals greater than 0.05.

[Insert Table 6 Here]

Factor Structure and Loadings

The rotated factor matrix can be seen in Table 7. Field (2018) recommends that items with loadings of below 0.4 should not be interpreted (Field, 2018). Only two items scored below 0.4 (6c and 6d). Item 6d only scored on one component and as a result, was not retained in the component structure. Item 6c loaded on two factors, and therefore only the loading above 0.4, in component six, was interpreted. The resulting scale is therefore comprised of six components, and 21 items.

The components were summarised thematically in the following categories:

1. Access to physical resources
2. Suitability of the clinical environment
3. Clinical supervision
4. Time to offer flexible sessions and prepare
5. Protocols for working outside the clinic
6. Professional development

[Insert Table 7 Here]

Reliability

Internal consistency

The scale demonstrated good overall internal consistency with Cronbach's Alpha score of 0.801 across 21 items. Table 8 summarises Cronbach's Alpha for each component.

Temporal Stability

A Spearman's Rho correlation indicated that the measure had adequate temporal stability when participants were re-contacted 7-14 days later ($r(96) = .735$, $p < .00$).

Construct Validity

On average, the sample (N=181) scored 3.9 (SD: 0.59) on the UWES out of a possible score of 6 and 98.26 (SD: 13.49) on the PPWWM (N=176) out of a possible score of 130. These mean scores are slightly higher than the mean values reported within normative datasets (UWES Mean: 3.82; SD: 1.09) and published papers (PPWWM Mean= 93.47; SD 17.67) (Schaufeli & Bakker, 2004; Summers et al., 2019).

Spearman's Rho correlations indicated a significant positive relationship between total support questionnaire scores and engagement (UWES) ($r(161) = .307$, $p < .00$) and between total support questionnaire scores and practitioner wellbeing (PPWWM) ($r(156) = .472$, $p < .00$). There was a moderate positive correlation between scores on the UWES and the PPWWM ($r(176) = .459$, $p < .00$).

Discussion

This study aimed to determine the psychometric properties of a measure of service infrastructure and resource support for CBT. The initial unpublished measure was developed with reference to published documents (British Association for Behavioural and Cognitive Psychotherapies, 2010; National Collaborating Centre for Mental Health, 2018; Roth & Pilling, 2008) and in consultation with CBT practitioners in the local area (Groom & Delgadillo, in communication). In the current study, properties of this measure were explored through consulting experts in the field and piloting the measure with CBT practitioners. This resulted in a shortened scale with good content validity. The scale is comprised of six components: access to physical resources; suitability of the clinical environment; clinical supervision; time to offer flexible sessions and prepare; working outside the clinic; professional development. The measure demonstrated construct validity through positive correlations with a measure of engagement and psychological practitioner wellbeing. It also demonstrated good internal consistency and adequate temporal stability.

Three of the components reflect core features of treatment protocols (working outside the clinic; increased frequency or duration of sessions; access to physical resources). The remaining components are consistent with practice in RCTs informing NICE guidelines, in which therapists receive high-quality, model-specific supervision, access to a suitable clinical environment and planned training and professional development. Environments supportive of the delivery of CBT are therefore those which incorporate the requirements of treatment protocols and facilitators of safe, competent practice into the frameworks of service delivery systems. This questionnaire provides a basis from which service infrastructure and support for CBT can be evaluated, audited, and compared.

Strengths and Limitations

This study has evidenced the validity and reliability of an existing measure of resource and infrastructure support for the delivery of CBT. The methodology used to develop the existing measure has not been published and is unavailable to appraise. The current study incorporated consultation with an expert panel to assure that the domain of measurement was fully represented by the items.

The measure was piloted with CBT practitioners from a wide range of professional backgrounds working in diverse range of settings. In the absence of a 'gold-standard' measure to compare the questionnaire against, the study capitalised on a model developed within the field of organisational psychology. The resulting measure is short, clear and items fit into six thematically distinct components.

The study recruited 188 participants, which is short of the recruitment target of 230. According to Comrey and Lee (2013) this sample size falls between 'poor' (100) and 'fair' (200). Although recommendations for participant to item ratios range from 5:1 to 30:1, because of their exploratory nature, most exploratory factor analysis (EFA) or PCA studies are conducted with participant to item ratios of 10:1 or lower (Costello & Osborne, 2005). Following the exclusion of three items, the participant to item ratio for this analysis was over 8:1. According to the Kaiser-Meyer-Olkin (Kaiser & Rice, 1974) measure of sampling adequacy, this sample was sufficient, however a larger samples would strengthen confidence in component loadings.

It is possible that relationships among questionnaire items may be influenced by sample composition. Firstly, over half the sample worked in Wales where there are fewer BABCP accredited practitioners (British Association for Behavioural and Cognitive

Psychotherapies, n.d.). It is therefore notable that two of the items removed prior to conducting the PCA were related to supervisor accreditation status.

Analysis of demographic characteristics indicated that BABCP accreditation status among participants was one of the only demographic factors to significantly influence scale scores (when $\alpha < 0.05$). However, to compensate for multiple comparisons, the Bonferroni correction was applied and as a result, these differences were considered insignificant. However, many argue that the Bonferroni method is too conservative and can mask meaningful results (Perneger, 1998).

Secondly, a quarter of participants were clinical psychology trainees. As temporary members of staff, trainees' perceptions of the resources and supports available to them may be influenced by the extra support afforded by their training programmes and/or limited availability of resources for temporary members of staff. Furthermore, of the trainees who participated, 80% (40/50) were enrolled on the South Wales Clinical Psychology Training Programme, which may introduce bias into the results. On the other hand, trainees enrolled on this programme work across several different services in four health boards and therefore it is arguable that this sample would have captured the variance required for the purposes of this study. As described previously, the PCA was conducted using Pearson correlations. Although the practice is widely adopted for the validation of questionnaires using ordinal scales, some argue it is not suitable for ordinal data (Baglin, 2014; Basto & Pereira, 2012). An alternative analysis using polychoric correlations (Appendix 13) yielded a very similar component structure. Despite a greater number of cross loadings, the essential structure remains intact apart from one item (6c) which loads more strongly onto the 'time to offer flexible sessions and prepare' component than the 'professional development' component.

Job-Demands-Resources Model

These findings are consistent with the Job Demands Resources model (Schaufeli & Bakker, 2004) and extend the application of the model to CBT practitioners. Resource and infrastructure support for CBT was found to predict work engagement among CBT therapists. The magnitude of this relationship is consistent with that reported in other studies (Bakker et al., 2007; Demerouti et al., 2001; Hakanen et al., 2005). Previous studies testing the JDR model have looked at the association between latent, unobservable job resources, such as job control or supervisor support with work engagement (Bakker et al., 2007). The current study demonstrates that physical resources and infrastructure which facilitate the delivery of CBT are also associated with engagement.

The relationship between job resources and workplace wellbeing has been demonstrated consistently across different professions and workplaces (Nielsen et al., 2017) including NHS doctors (Teoh, Hassard, Cox et al., 2020) and mental health professionals (Scanlan & Still, 2019). This study is the first to specifically assess the relationship between job resources and the wellbeing of psychological practitioners. According to the JDR model, high job demands predict poor health and wellbeing through increasing the likelihood of burnout (Schaufeli & Bakker, 2004). Job resources may therefore minimise the impact of job demands on health and wellbeing of psychological practitioners, through buffering against burnout (Bakker et al., 2007). In contrast, the likelihood of burnout is increased when job demands are high and resources are low (Schaufeli et al., 2009).

Work engagement, Psychological Wellbeing and Organisational Outcomes

The United Kingdom's four nations have adopted different organisational frameworks for the delivery of psychological therapies. The IAPT initiative in England is notable for adopting a centralised approach to the provision of psychological therapies and routine publication of clinical outcome data (Clark, 2018). However, research into the health and wellbeing of staff in IAPT services is still in its infancy. Early investigations are consistent with the JDR model and indicate that practitioners working in IAPT services are subject to high job demands, including organisational targets, large caseloads, and complex client presentations (Scott, 2015).

IAPT practitioners experience high levels of burnout and emotional exhaustion (Steel et al., 2015; Westwood et al., 2017). Consistent with the JDR model, they cite organisational support as a key factor in the development of burnout and work-related stress (Steel et al., 2015). Quality and frequency of supervision, time for reflection and learning/training are noted as significant in their experiences of burnout and stress (Scott, 2015). In line with the JDR model, Steel et al., (2015) found that high levels of emotional exhaustion are predicted by a combination of high job demands and lack of resources.

The JDR model proposes that job resources stimulate positive organisational outcomes through boosting engagement. Employees who are more engaged perform better at work and are less likely to consider leaving (Schaufeli & Bakker, 2004). This is significant for IAPT services, which have reported high rates of turnover (Scott et al., 2015; NHS England, 2015). In healthcare settings, organisational performance is reflected in the quality and safety of patient care. Associations between work engagement and organisational performance have been demonstrated in NHS settings: The King's Fund found that work

engagement is associated with greater patient satisfaction, improved patient safety and reduced mortality (West & Dawson, 2002).

In summary, these findings confirm the construct validity of the questionnaire and confirm that resource infrastructure and support for CBT increases work engagement and psychological wellbeing among CBT practitioners. According to the JDR model, job resources may boost organisational outcomes and protect against the staff burnout. This study suggests job resources should be a core concern in services in which demands on staff are often high and primary outcomes are those of patient safety and quality of care.

Implications for practice and further research

This study has evidenced the validity and reliability of an index for measuring service support for CBT. Future studies may wish to replicate and extend this validation process with larger samples of CBT practitioners working across the UK. The results are consistent with the JDR model and indicate that resources and infrastructure supporting CBT therapists boost engagement with work and work-related wellbeing. Future research may wish to test the JDR model further by assessing whether job resources are predictive of wider organisational outcomes, such as or organisational commitment, turnover intention and performance at work. Building on research indicating that work engagement may predict quality of care (West & Dawson, 2002), future research could investigate whether job resources are predictive of therapist competence and improved patient outcomes.

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Tables

Table 1

		Content Validity Ratio			Content Validity Index	
Question	**N**	**CVR**	**Critical Value**	**Interpretation**	**CVI**	**Interpretation**
1a	20	0.60	0.44	Essential	0.85	Relevant
1b	19	0.89	0.45	Essential	0.89	Relevant
1c	19	0.68	0.45	Essential	0.89	Relevant
2a	20	0.70	0.44	Essential	0.95	Relevant
2b	19	0.26	0.45	Agreement does not exceed chance	0.84	Relevant
2c	15	0.60	0.51	Essential	0.93	Relevant
2d	15	-0.07	0.51	Agreement does not exceed chance	0.80	Relevant
3a	20	0.10	0.44	Agreement does not exceed chance	0.85	Relevant
4a	20	0.30	0.44	Agreement does not exceed chance	1.00	Relevant
4b	20	0.90	0.44	Essential	1.00	Relevant
4c	19	0.26	0.45	Agreement does not exceed chance	1.00	Relevant
4d	19	0.47	0.45	Essential	1.00	Relevant
5a	20	1.00	0.44	Essential	1.00	Relevant
5b	20	1.00	0.44	Essential	1.00	Relevant
5c	20	1.00	0.44	Essential	0.95	Relevant
5d	20	0.40	0.44	Agreement does not exceed chance	0.90	Relevant
5e	20	0.10	0.44	Agreement does not exceed chance	0.70	Borderline
6a	20	0.50	0.44	Essential	0.90	Relevant
6b	20	0.40	0.44	Agreement does not exceed chance	0.90	Relevant
6c	20	0.40	0.44	Agreement does not exceed chance	0.80	Relevant
6d	20	0.80	0.44	Essential	0.95	Relevant
7a	20	0.60	0.44	Essential	0.90	Relevant
7b	20	0.70	0.44	Essential	0.90	Relevant

7c	20	0.70	0.44	Essential	0.90	Relevant
7d	20	0.60	0.44	Essential	0.95	Relevant
Full Scale					0.92	

Table 1. Content Validity Index (CVI) and Content Validity Ratio (CVR) values.

Table 2

Variable	Mean (SD)	N	(%)
Gender (N=188)	Male	48	25.5
	Female	140	74.5
Age (N=188)	38.79 (SD:10.91)		
Location (N=188)	Wales	98	51.6
	England	84	44.7
	Scotland	6	3.2
Profession	Clinical Psychologist	40	21.3
	Counselling Psychologist	2	1.1
	High Intensity Therapist / CBT Therapist	55	29.3
	Nurse	23	12.2
	Occupational Therapist	4	2.1
	Psychological Wellbeing Practitioner	3	1.6
	Trainee clinical psychologist	50	26.6
	Medical Doctor	2	1.1
	Social Worker	1	0.5
	Trainee High Intensity Therapist	2	1.1
	Other	5	2.7
Training Programme	DClinPsy	50	26.6
	CBT Certificate	10	5.3
	CBT Diploma / HI Training	13	6.9
	Other	5	2.7
	Not Applicable	110	58.5
BABCP Accredited Practitioners	Yes	65	34.6
	No	123	65.4
CBT PG Training	Yes	102	54.3
	No	86	45.7
Service Type	Third Sector, Education or Private	6	3.2
	Older Adult Mental Health	9	4.8
	Learning Disability	3	1.6
	CAMHS or Children's Services	22	11.7
	Adult Mental Health – Primary Care	53	28.2
	Adult Mental Health – Specialist Services	55	29.3
	Adult Mental Health – Community Mental Health Team	29	15.4
	Missing Data	11	5.9

Table 2. Participant Demographic Characteristics

Table 3

	Eta (η)	***F (df)***	***P Value***
Gender	*0.060*	*.667 (1,186)*	*.415*
Service Type	*0.190*	*1.059 (6,170)*	*.389*
Country	*0.141*	*1.876 (2,184)*	*.156*
Profession	*0.275*	*1.308 (11,176)*	*.223*
Training Programme	*0.149*	*.562 (3,74)*	*.642*
BABCP Accreditation	*0.170*	*.526 (1,86)*	*.020*
CBT PG Training	*0.40*	*0.303*	*.583*

Table 3. Tests of association (Eta, One-Way ANOVA) between demographic characteristics and scale scores.

Table 4

N	*Range*	*Minimum*	*Maximum*	*Median*	*Mode*	*Mean*	*Standard Deviation*
188	*34*	*6*	*40*	*29*	*33*	*28.56*	*6.38*

Table 4. Scale Characteristics

Table 5

	'Don't Know' Responses (N=188)	**Mean (N= 129)**	**SD (N=129)**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
1a	12 (6.4)	1.62	0.64	0.35	0.80
1b	N/A	1.53	0.64	0.32	0.80
1c	N/A	1.56	0.67	0.16	0.80
2a	N/A	1.65	0.58	0.28	0.80
2b	N/A	1.31	0.81	0.33	0.80
2c	N/A	1.74	0.55	0.25	0.80
2d	N/A	1.02	0.87	0.22	0.80
3a	N/A	0.84	0.90	0.44	0.79
4a	N/A	0.95	0.92	0.51	0.79
4b	9 (4.8)	1.58	0.73	0.50	0.79
4c	N/A	1.41	0.78	0.59	0.78
4d	N/A	0.95	0.79	0.44	0.79
5a	N/A	1.66	0.55	0.54	0.79
5b	N/A	1.71	0.60	0.39	0.79
5c	N/A	1.72	0.52	0.35	0.80
5d	14 (7.4)	1.21	0.96	0.25	0.80
5e	44 (23.4)	0.74	0.95	0.11	0.81
6a	N/A	1.22	0.82	0.39	0.79
6b	N/A	1.39	0.82	0.30	0.80
6c	N/A	0.90	0.85	0.31	0.80
6d	N/A	1.47	0.71	0.38	0.79
7a	N/A	1.75	0.48	0.24	0.80
7b	N/A	1.59	0.63	0.20	0.80
7c	N/A	1.64	0.57	0.28	0.80
7d	N/A	1.46	0.68	0.40	0.79

Table 5. Item Analysis

Table 6

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	**Total**	**% Variance**	**% Cumulative**	**Total**	**% Variance**	**% Cumulative**	**Total**	**% Variance**	**% Cumulative**
1	4.38	19.89	19.89	4.38	19.89	19.89	2.51	11.40	11.40
2	2.00	9.11	28.99	2.00	9.11	28.99	2.26	10.27	21.67
3	1.80	8.17	37.16	1.80	8.17	37.16	2.06	9.35	31.02
4	1.63	7.39	44.55	1.63	7.39	44.55	1.91	8.67	39.68
5	1.39	6.33	50.88	1.39	6.33	50.88	1.87	8.50	48.19
6	1.25	5.69	56.57	1.25	5.69	56.57	1.85	8.39	56.57

Table 6. Table of Total Variance

Table 7

	Components					
Items	**1**	**2**	**3**	**4**	**5**	**6**
3a. In practice, do you have access to video **recording** and video **play back** for use in your clinic room (or other suitable, accessible and appropriate clinical environment)? (Note: if you are using your personal equipment, answer NO and explain this in notes).	.84					
4a. In practice, do you have access to video / audio play back equipment for use as part of supervision and/or clinical self-reflection? (Note: if you are using your personal equipment, answer YES and explain this in notes).	.80					
4b. Are protocols and permissions in place to enable the recording of clinical sessions?	.66					
4c. Do you have access to a suitable environment for listening/watching recordings of clinical sessions?	.56					
1c. In practice, can you access the internet to use resources such as YouTube and other publicly available material as and when required by the treatment protocol?	.43					
7b. *Safety*: Is the clinic room that you use set out in such a way that reasonably ensures the safety of therapist and client? (e.g. consider emergency exit, availability of panic alarms, any safeguards or procedures to deal with violent incidents, etc.)		.77				
7d. Is the clinic room that you use 'fit for purpose' as described above? (e.g. consider fittings, furniture, equipment, etc.)		.75				
7c. *Accessibility*: Does the clinic room that you use allow for the safe and appropriate treatment of		.74				
7a. *Confidentiality*: Does the clinic room that you use allow communication to remain confidential?		.58				
5a. Is the *type* of supervision you receive adequate for you to deliver treatment which closely approximates that of the RCTs in the NICE guidance?			.83			
5b. Is the *quantity* (e.g. frequency, duration, enough time to discuss your own cases if supervision is in a group) of your supervision sufficient for you to deliver treatment which closely approximates that of the RCTs in the NICE guidance?			.75			
5c. Are the *knowledge, skills and experience* of the supervisor well matched to the type of treatment protocols you use?			.73			

2a. In practice, are you able to offer extended sessions of up to 90 minutes when appropriate?				.70		
2b. In practice, are you able to offer bi-weekly appointments when appropriate?				.68		
4d. Is your allocated admin time sufficient to review audio or video material for the purpose of reflection and/or preparation for supervision? (Note: 'admin time' refers to non face-to-face therapy activity, for example designated time to review notes, write reports, prepare for sessions, etc.).				.58		
2c. Does your service allow for an extended number of sessions if required, in line with NICE guidance?				.56		
6b. Is the PDP monitored and supported in line with trust wide standards? (e.g. one appraisal per year and 6 monthly reviews).					.84	
6a. Do you have a Professional Development Plan (PDP) in place which sufficiently identifies CBT specific training priorities for yourself and places these in the context of CBT training needs for the service?					.82	
6c. Does the service have a clear policy specifying an allocation of time and resource to spend on CPD activity per week or per month?				.31	.49	
1b. In practice, are you able to treat clients outside of the clinic as and when required by the treatment protocol?						.82
1a. Are protocols and permissions in place to enable you to assess and treat patients outside of the clinic? (e.g. lone working policy, risk management protocol).						.82
6d. Bearing in mind practical and realistic limitations on training budgets, have you received adequate training to deliver treatment which closely approximates that of the RCTs in the NICE guidance?						.37

Table 7. Rotated Factor Matrix

Table 8

Component	Cronbach's Alpha
Access to physical resources	0.736
Suitability of the clinical environment	0.712
Clinical supervision	0.732
Time to offer flexible sessions and prepare	0.588
Protocols for working outside the clinic	0.623
Professional development	0.630

Table 8. Cronbach's Alpha for each component

Appendices

Appendix 1. Service Support Questionnaire (Groom & Delgadillo, 2012)

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Appendix 2. Content Validity Survey

Critical Appraisal Survey of CBT Service Support Questionnaire

You are being invited to participate in a research study to validate a questionnaire which audits the key supports (in terms of resources and infrastructure) which facilitate therapist engagement, wellbeing and competent practice.

Kindly review this tool and provide your feedback on the following:

1. The relevance of each question in the tool (how important is the question)
2. The essentiality of each question (how necessary is each question)

Critical Appraisal Survey of CBT Service Support Questionnaire

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Appendix 3. Demographic and Training Questionnaire

DEMOGRAPHIC AND TRAINING QUESTIONNAIRE

1. How old are you? _____
2. Gender (please circle): Male/Female
3. What type of service do you work in?
    a. IAPT
    b. Adult Mental Health Service
    c. Older Adult Mental Health Service
    d. Specialist PTSD service
    e. Child and Adolescent Mental Health Service
    f. Other (please specify) _____
4. If you work in more than one service, please specify the total number of services you work in? _____
5. Where in the UK do you work?
    a. England
    b. Wales
    c. Scotland
    d. Northern Ireland
6. What is your profession?
    a. Psychological Wellbeing Practitione
    b. High Intensity Therapist
    c. Nurse
    d. Occupational Therapist
    e. Clinical Psychologist
    f. Counselling Psychologist

g. Trainee Clinical Psychologist

h. Other (please specify): _____

7. If you are currently enrolled on a training course (for example CBT diploma/certificate, clinical/counselling psychology, PWP), please specify below:

_____

TRAINING QUESTIONNAIRE

1. Are you a BABCP accredited practitioner? Yes / no (please circle)
2. Have you completed a postgraduate training programme in CBT? Yes/ No
3. If you are a BABCP accredited practitioner, how long have you been accredited for? (Please answer in years, months).

   _____

4. Are you working towards accreditation with the BABCP? Yes / No

Appendix 4. Utrecht Work Engagement Scale

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Appendix 5. Psychological Practitioner Workplace Wellbeing Scale.

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Appendix 6. Notice of Ethical Approval

From: psychethics <psychethics@cardiff.ac.uk>
Sent: Friday, November 15, 2019 2:43:15 PM
To: Ffion Evans <EvansF6@cardiff.ac.uk>
Cc: Louise Waddington <WaddingtonL1@cardiff.ac.uk>
Subject: Ethics Feedback - EC.19.09.10.5689A

Dear Ffion,

The Ethics Committee has considered the amendment to your PG project proposal: Service Support for CBT: Validation and pilot of an audit questionnaire (EC.19.09.10.5689A).

The amendment has been approved.

Please note that if any changes are made to the above project then you must notify the Ethics Committee.

Best wishes,
Adam Hammond

School of Psychology Research Ethics Committee

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Appendix 7. Notice of Ethical Approval

From: Rapid <RAPID@cardiff.ac.uk>
Sent: 26 February 2020 09:07
To: Ffion Evans <EvansF6@cardiff.ac.uk>
Subject: RAPID substantial amendment 6

Hi Ffion,

I just wanted to let you know that the amendment has gone live in all the sites except for NHS Lothian. Unfortunately they requested extra time to review the amendment and have not been very clear on how much additional time is required. I will continue to chase them up and let you know when the amendment goes live there.

You are free to contact and schedule appointments with therapists.

Thank you

Paula Foscarini-Craggs, PhD
RAPID Trial Manager

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Appendix 8. Inter-Item Pearson Correlation Matrix (All Items)

	1a	1b	1c	2a	2b	2c	2d	3a	4a	4b	4c	4d	5a	5b	5c	5d	6a	6b	6c	6d	7a	7b	7c	7d
1a	1.00	0.55	-0.02	0.16	0.08	0.09	-0.04	0.09	0.14	0.19	0.17	0.16	0.22	0.20	0.13	0.10	0.19	0.19	0.08	0.21	0.25	0.04	0.14	0.08
1b	0.55	1.00	0.00	0.22	0.19	0.06	0.03	0.05	0.16	0.21	0.19	0.23	0.25	0.22	0.07	0.10	0.10	0.03	-0.01	0.32	0.03	0.03	-0.02	0.03
1c	-0.02	0.00	1.00	0.09	0.04	0.00	0.07	0.20	0.16	0.17	0.23	0.13	0.11	0.03	0.07	-0.02	-0.08	-0.05	-0.05	0.06	0.04	0.03	0.08	0.15
2a	0.16	0.22	0.09	1.00	0.30	0.31	0.23	0.12	0.16	0.20	0.24	0.27	0.12	0.21	0.05	-0.06	0.11	0.01	0.08	0.18	0.11	0.01	0.10	0.08
2b	0.08	0.19	0.04	0.30	1.00	0.21	0.24	0.09	0.15	0.08	0.22	0.33	0.13	0.07	0.15	-0.05	0.12	0.08	0.21	0.09	0.11	0.21	0.17	0.24
2c	0.09	0.06	0.00	0.31	0.21	1.00	0.29	0.12	0.16	0.01	0.17	0.20	0.18	0.12	0.09	-0.17	0.10	0.12	0.12	0.18	0.16	0.24	0.26	0.14
2d	-0.04	0.03	0.07	0.23	0.24	0.29	1.00	0.09	0.05	0.10	0.15	0.14	0.14	0.05	0.00	-0.11	0.07	0.04	0.18	0.16	-0.06	-0.03	0.07	0.06
3a	0.09	0.05	0.20	0.12	0.09	0.12	0.09	1.00	0.72	0.37	0.38	0.13	0.11	0.05	0.16	0.18	0.13	0.03	0.21	0.13	0.03	0.02	0.12	0.21
4a	0.14	0.16	0.16	0.16	0.15	0.16	0.05	0.72	1.00	0.42	0.35	0.23	0.20	0.12	0.21	0.12	0.20	0.07	0.21	0.18	0.07	0.03	0.14	0.21
4b	0.19	0.21	0.17	0.20	0.08	0.01	0.10	0.37	0.42	1.00	0.43	0.23	0.19	0.14	0.05	0.27	0.20	0.09	0.20	0.14	0.07	-0.01	0.09	0.10
4c	0.17	0.19	0.23	0.24	0.22	0.17	0.15	0.38	0.35	0.43	1.00	0.27	0.26	0.21	0.20	0.16	0.23	0.17	0.09	0.19	0.15	0.15	0.27	0.33
4d	0.16	0.23	0.13	0.27	0.33	0.20	0.14	0.13	0.23	0.23	0.27	1.00	0.31	0.32	0.10	-0.14	0.16	0.14	0.19	0.20	0.08	0.14	0.04	0.20
5a	0.22	0.25	0.11	0.12	0.13	0.18	0.14	0.11	0.20	0.19	0.26	0.31	1.00	0.60	0.49	0.26	0.11	0.10	0.07	0.19	0.05	0.11	0.10	0.14
5b	0.20	0.22	0.03	0.21	0.07	0.12	0.05	0.05	0.12	0.14	0.21	0.32	0.60	1.00	0.33	0.03	0.07	0.12	0.07	0.21	0.10	0.08	0.06	0.12
5c	0.13	0.07	0.07	0.05	0.15	0.09	0.00	0.16	0.21	0.05	0.20	0.10	0.49	0.33	1.00	0.26	0.17	0.16	0.08	0.18	0.02	0.05	0.04	0.13
5d	0.10	0.10	-0.02	-0.06	-0.05	-0.17	-0.11	0.18	0.12	0.27	0.16	-0.14	0.26	0.03	0.26	1.00	0.10	-0.01	0.01	0.13	0.06	-0.03	0.05	0.06
6a	0.19	0.10	-0.08	0.11	0.12	0.10	0.07	0.13	0.20	0.20	0.23	0.16	0.11	0.07	0.17	0.10	1.00	0.61	0.22	0.18	-0.02	-0.01	0.13	0.03
6b	0.19	0.03	-0.05	0.01	0.08	0.12	0.04	0.03	0.07	0.09	0.17	0.14	0.10	0.12	0.16	-0.01	0.61	1.00	0.26	0.18	0.07	0.05	0.13	0.00
6c	0.08	-0.01	-0.05	0.08	0.21	0.12	0.18	0.21	0.21	0.20	0.09	0.19	0.07	0.07	0.08	0.01	0.22	0.26	1.00	0.14	0.07	0.00	0.08	0.12
6d	0.21	0.32	0.06	0.18	0.09	0.18	0.16	0.13	0.18	0.14	0.19	0.20	0.19	0.21	0.18	0.13	0.18	0.18	0.14	1.00	0.06	0.13	0.03	0.18
7a	0.25	0.03	0.04	0.11	0.11	0.16	-0.06	0.03	0.07	0.07	0.15	0.08	0.05	0.10	0.02	0.06	-0.02	0.07	0.07	0.06	1.00	0.27	0.26	0.31
7b	0.04	0.03	0.03	0.01	0.21	0.24	-0.03	0.02	0.03	-0.01	0.15	0.14	0.11	0.08	0.05	-0.03	-0.01	0.05	0.00	0.13	0.27	1.00	0.42	0.52
7c	0.14	-0.02	0.08	0.10	0.17	0.26	0.07	0.12	0.14	0.09	0.27	0.04	0.10	0.06	0.04	0.05	0.13	0.13	0.08	0.03	0.26	0.42	1.00	0.46
7d	0.08	0.03	0.15	0.08	0.24	0.14	0.06	0.21	0.21	0.10	0.33	0.20	0.14	0.12	0.13	0.06	0.03	0.00	0.12	0.18	0.31	0.52	0.46	1.00

Appendix 9. Inter-Item Pearson Correlation Matrix (only items included in analysis)

	1a	1b	2a	2b	2c	3a	4a	4b	4c	4d	5a	5b	5c	6a	6b	6c	6d	7a	7b	7c	7d
1a	1.00	0.55	0.16	0.08	0.09	0.09	0.14	0.19	0.17	0.16	0.22	0.20	0.13	0.19	0.19	0.08	0.21	0.25	0.04	0.14	0.08
1b	0.55	1.00	0.22	0.19	0.06	0.05	0.16	0.21	0.19	0.23	0.25	0.22	0.07	0.10	0.03	-0.01	0.32	0.04	0.03	-0.02	0.03
2a	0.16	0.22	1.00	0.30	0.31	0.12	0.16	0.20	0.24	0.27	0.12	0.21	0.05	0.11	0.01	0.08	0.18	0.11	0.01	0.10	0.08
2b	0.08	0.19	0.30	1.00	0.21	0.09	0.15	0.08	0.22	0.33	0.13	0.07	0.15	0.12	0.08	0.21	0.09	0.11	0.21	0.17	0.24
2c	0.09	0.06	0.31	0.21	1.00	0.12	0.16	0.01	0.17	0.21	0.18	0.12	0.09	0.10	0.12	0.12	0.18	0.16	0.24	0.26	0.14
3a	0.09	0.05	0.12	0.09	0.12	1.00	0.72	0.37	0.38	0.13	0.11	0.05	0.16	0.13	0.03	0.21	0.13	0.03	0.03	0.12	0.21
4a	0.14	0.16	0.16	0.15	0.16	0.72	1.00	0.42	0.35	0.23	0.20	0.12	0.21	0.20	0.07	0.21	0.18	0.07	0.03	0.14	0.21
4b	0.19	0.21	0.20	0.08	0.01	0.37	0.42	1.00	0.43	0.23	0.19	0.14	0.05	0.20	0.09	0.20	0.14	0.07	-0.01	0.09	0.10
4c	0.17	0.19	0.24	0.22	0.17	0.38	0.35	0.43	1.00	0.27	0.26	0.21	0.20	0.23	0.17	0.09	0.19	0.15	0.15	0.27	0.33
4d	0.16	0.23	0.27	0.33	0.21	0.13	0.23	0.23	0.27	1.00	0.31	0.32	0.10	0.16	0.14	0.20	0.20	0.08	0.15	0.04	0.20
5a	0.22	0.25	0.12	0.13	0.18	0.11	0.20	0.19	0.26	0.31	1.00	0.60	0.49	0.11	0.10	0.07	0.19	0.05	0.11	0.10	0.14
5b	0.20	0.22	0.21	0.07	0.12	0.05	0.12	0.14	0.21	0.32	0.60	1.00	0.33	0.07	0.12	0.07	0.21	0.10	0.08	0.06	0.12
5c	0.13	0.07	0.05	0.15	0.09	0.16	0.21	0.05	0.20	0.10	0.49	0.33	1.00	0.17	0.16	0.08	0.18	0.02	0.05	0.04	0.13
6a	0.19	0.10	0.11	0.12	0.10	0.13	0.20	0.20	0.23	0.16	0.11	0.07	0.17	1.00	0.61	0.22	0.18	-0.02	-0.01	0.13	0.03
6b	0.19	0.03	0.01	0.08	0.12	0.03	0.07	0.09	0.17	0.14	0.10	0.12	0.16	0.61	1.00	0.26	0.18	0.07	0.06	0.13	0.00
6c	0.08	-0.01	0.08	0.21	0.12	0.21	0.21	0.20	0.09	0.20	0.07	0.07	0.08	0.22	0.26	1.00	0.14	0.07	0.00	0.08	0.12
6d	0.21	0.32	0.18	0.09	0.18	0.13	0.18	0.14	0.19	0.20	0.19	0.21	0.18	0.18	0.18	0.14	1.00	0.06	0.13	0.03	0.18
7a	0.25	0.04	0.11	0.11	0.16	0.03	0.07	0.07	0.15	0.08	0.05	0.10	0.02	-0.02	0.07	0.07	0.06	1.00	0.27	0.26	0.31
7b	0.04	0.03	0.01	0.21	0.24	0.03	0.03	-0.01	0.15	0.15	0.11	0.08	0.05	-0.01	0.06	0.00	0.13	0.27	1.00	0.42	0.52
7c	0.14	-0.02	0.10	0.17	0.26	0.12	0.14	0.09	0.27	0.04	0.10	0.06	0.04	0.13	0.13	0.08	0.03	0.26	0.42	1.00	0.46
7d	0.08	0.03	0.08	0.24	0.14	0.21	0.21	0.10	0.33	0.20	0.14	0.12	0.13	0.03	0.00	0.12	0.18	0.31	0.52	0.46	1.00

Appendix 10. Inter-Item Polyhcoric Correlation Matrix (all items)

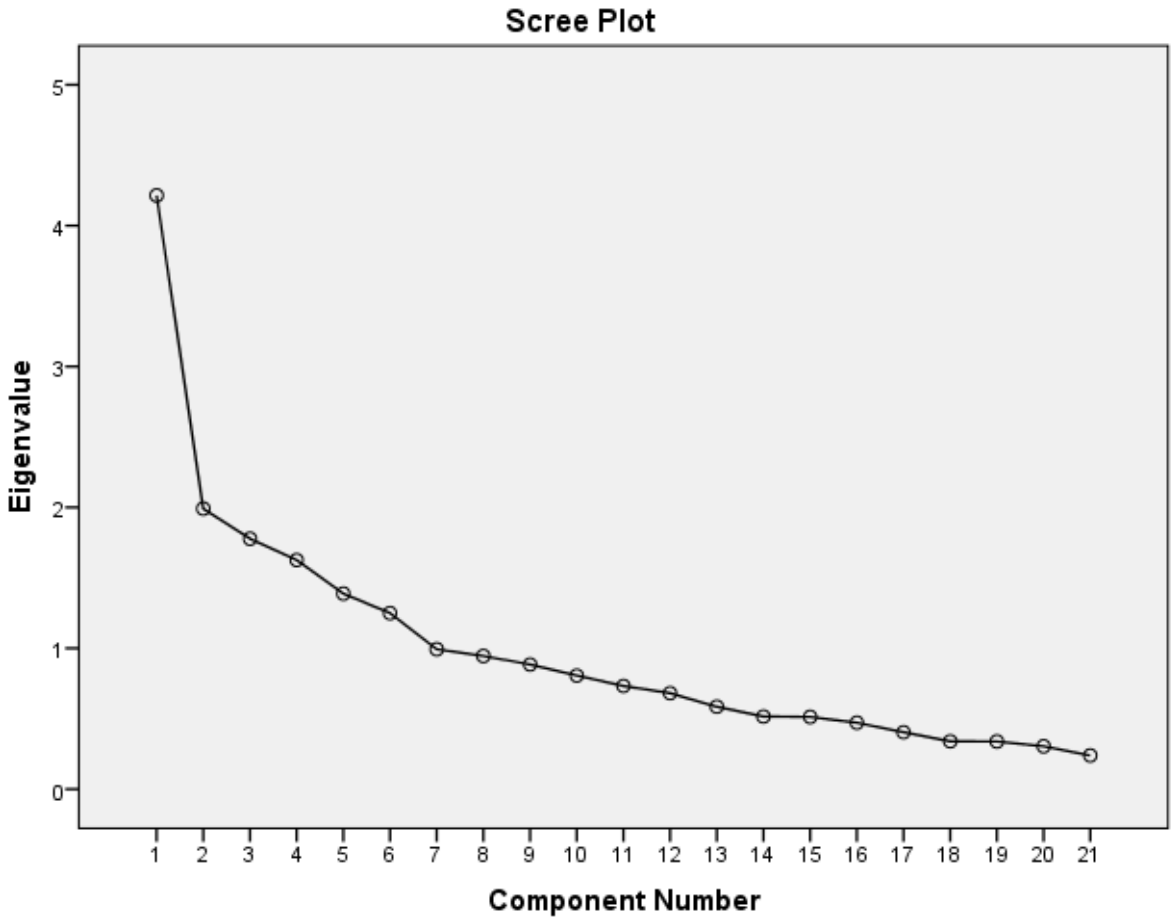
	1a	1b	1c	2a	2b	2c	2d	3a	4a	4b	4c	4d	5a	5b	5c	5d	6a	6b	6c	6d	7a	7b	7c	7d
1a	1.00																							
1b	0.70	1.00																						
1c	0.09	0.03	1.00																					
2a	0.29	0.41	0.17	1.00																				
2b	0.12	0.33	0.15	0.38	1.00																			
2c	0.20	0.19	0.02	0.57	0.35	1.00																		
2d	-0.03	0.09	0.17	0.38	0.33	0.43	1.00																	
3a	0.13	0.03	0.31	0.25	0.16	0.23	0.16	1.00																
4a	0.18	0.17	0.25	0.28	0.25	0.24	0.13	0.90	1.00															
4b	0.34	0.33	0.13	0.29	0.16	0.07	0.20	0.57	0.61	1.00														
4c	0.28	0.26	0.39	0.41	0.34	0.26	0.27	0.58	0.52	0.61	1.00													
4d	0.32	0.42	0.14	0.44	0.50	0.31	0.14	0.26	0.42	0.43	0.48	1.00												
5a	0.41	0.43	0.07	0.26	0.24	0.37	0.28	0.23	0.34	0.37	0.41	0.46	1.00											
5b	0.36	0.37	0.03	0.33	0.17	0.29	0.16	0.19	0.24	0.26	0.37	0.55	0.84	1.00										
5c	0.27	0.14	0.04	0.12	0.25	0.17	0.11	0.29	0.32	0.08	0.30	0.27	0.73	0.52	1.00									
5d	0.16	0.11	0.03	-0.06	-0.08	-0.27	-0.14	0.24	0.15	0.42	0.28	-0.13	0.47	0.15	0.47	1.00								
6a	0.30	0.26	-0.11	0.24	0.20	0.20	0.15	0.15	0.27	0.33	0.35	0.28	0.35	0.24	0.31	0.14	1.00							
6b	0.37	0.19	-0.16	0.13	0.11	0.24	0.12	0.07	0.09	0.15	0.29	0.27	0.27	0.29	0.27	-0.03	0.78	1.00						
6c	0.11	0.09	-0.07	0.20	0.33	0.22	0.25	0.32	0.35	0.36	0.19	0.29	0.21	0.19	0.17	0.05	0.29	0.34	1.00					
6d	0.33	0.45	0.12	0.24	0.12	0.25	0.27	0.20	0.26	0.20	0.28	0.30	0.30	0.32	0.28	0.19	0.33	0.30	0.19	1.00				
7a	0.38	0.14	0.07	0.26	0.30	0.32	-0.05	0.04	0.12	0.18	0.36	0.17	0.24	0.21	0.07	0.10	0.03	0.13	0.08	0.09	1.00			
7b	0.11	0.08	0.15	0.12	0.36	0.41	-0.07	-0.02	0.05	0.03	0.19	0.31	0.23	0.25	0.09	-0.13	-0.01	0.06	-0.01	0.17	0.59	1.00		
7c	0.35	0.13	0.14	0.24	0.36	0.46	0.06	0.16	0.20	0.17	0.40	0.12	0.30	0.19	0.08	0.12	0.23	0.17	0.06	0.10	0.51	0.57	1.00	

7d	0.24	0.18	0.33	0.14	0.39	0.19	0.06	0.32	0.35	0.23	0.45	0.37	0.31	0.28	0.24	0.08	0.04	-0.02	0.19	0.24	0.60	0.64	0.59	1.00

Appendix 11. Inter-Item Polychoric Correlation Matrix (only items included in analysis)

	1a	**1b**	**2a**	**2b**	**2c**	**3a**	**4a**	**4b**	**4c**	**4d**	**5a**	**5b**	**5c**	**6a**	**6b**	**6c**	**6d**	**7a**	**7b**	**7c**	**7d**
1a	1.00																				
1b	0.70	1.00																			
2a	0.08	0.01	1.00																		
2b	0.30	0.38	0.17	1.00																	
2c	0.15	0.33	0.14	0.44	1.00																
3a	0.23	0.19	0.02	0.56	0.35	1.00															
4a	0.12	0.01	0.31	0.26	0.19	0.20	1.00														
4b	0.19	0.16	0.20	0.27	0.26	0.28	0.87	1.00													
4c	0.30	0.30	0.20	0.28	0.16	0.06	0.58	0.58	1.00												
4d	0.26	0.25	0.40	0.39	0.35	0.24	0.57	0.51	0.63	1.00											
5a	0.35	0.42	0.19	0.46	0.51	0.33	0.26	0.39	0.42	0.48	1.00										
5b	0.42	0.39	0.11	0.25	0.22	0.37	0.20	0.32	0.34	0.39	0.48	1.00									
5c	0.38	0.38	0.02	0.30	0.16	0.30	0.18	0.26	0.24	0.36	0.54	0.81	1.00								
6a	0.26	0.14	0.01	0.11	0.25	0.16	0.28	0.35	0.07	0.31	0.25	0.70	0.53	1.00							
6b	0.26	0.24	-0.08	0.24	0.20	0.22	0.16	0.29	0.36	0.35	0.25	0.29	0.21	0.30	1.00						
6c	0.33	0.16	-0.10	0.09	0.08	0.23	0.08	0.12	0.19	0.29	0.25	0.23	0.28	0.26	0.77	1.00					
6d	0.12	0.07	-0.06	0.20	0.32	0.23	0.33	0.34	0.35	0.17	0.30	0.20	0.18	0.14	0.29	0.34	1.00				
7a	0.39	0.12	0.11	0.24	0.26	0.33	0.08	0.11	0.15	0.31	0.20	0.22	0.23	0.05	-0.02	0.13	0.13	1.00			
7b	0.11	0.10	0.14	0.11	0.35	0.34	0.00	0.01	0.04	0.20	0.28	0.18	0.23	0.09	-0.01	0.03	-0.03	0.52	1.00		
7c	0.31	0.08	0.17	0.23	0.35	0.42	0.16	0.19	0.18	0.40	0.10	0.25	0.17	0.08	0.22	0.18	0.04	0.48	0.55	1.00	
7d	0.22	0.14	0.31	0.17	0.39	0.17	0.31	0.30	0.22	0.43	0.33	0.25	0.24	0.23	0.03	-0.04	0.18	0.55	0.64	0.60	1.00

Appendix 12. Scree Plot



Appendix 13. PCA Results using Polychoric Correlations

Polychoric correlations were created using the FACTOR programme (Lorenzo-Seva & Ferrando, 2006) and input to a PCA analysis in SPSS (IBM Corp, 2015) using the syntax function. Prior to analysis, inspection of the correlation matrix indicated items 2d, 5d, and 6d could be removed due to insufficient inter-item correlations (below 0.3). The polychoric correlation matrix indicated that item 1c was sufficiently related to other items to be retained in analysis. A Principal Components Analysis (PCA) with orthogonal rotation (Varimax) was conducted using these correlations, excluding items 2d, 5d, 5e and 6d (as in the main analysis).

The analysis indicated that the data did not meet the assumptions required for a PCA. The minimum threshold for satisfactory sampling was not met (.337), as indicated by the Kaiser-Meyer-Olkin (KMO) statistic (.337). Only one inter-item correlation surpassed this minimum threshold. Although Bartlett's test of sphericity (P=0.00) indicated the data was sufficiently related for data reduction, the determinant indicated (<.0000) that the data was affected by multicollinearity. Interpretation of data which does not meet these assumptions can result in inaccurate or biased findings (Field, 2018). Nevertheless, the results are presented here for the purposes of comparison with the analysis conducted.

A PCA using varimax rotation generated six components explaining 71.51% of the variance. The residuals matrix indicated that the rotated matrix was a less adequate fit than the one presented in the main analysis, with 40% of nonredundant residuals greater than 0.05. As a review of scree plots (Cattell, 1966) is only reliable only for samples above 200 (Sevens, 2000) therefore the Kaiser criterion was applied for factor extraction in this analysis also (Kaiser, 1970) can be consulted when choosing the number of factors to extract.

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	**Total**	**% Variance**	**% Cumulative**	**Total**	**% Variance**	**% Cumulative**	**Total**	**% Variance**	**% Cumulative**
1	6.37	30.32	30.32	6.37	30.32	30.32	3.17	15.10	15.10
2	2.40	11.43	41.75	2.40	11.43	41.75	2.91	13.87	28.96
3	2.10	9.98	51.73	2.10	9.98	51.73	2.51	11.96	40.92
4	1.52	7.25	58.98	1.52	7.25	58.98	2.31	10.99	51.91
5	1.39	6.63	65.61	1.39	6.63	65.61	2.08	9.92	61.83
6	1.24	5.90	71.51	1.24	5.90	71.51	2.03	9.68	71.51

Table a. Table of Total Variance

The rotated component matrix also identified 6 components, which converged on the same themes as within the main analysis. The main difference between the rotated component matrices is that the current matrix contains more cross-loadings. The only cross-loading to change the component structure is 6c, which in the present analysis loads more highly onto component 4 (time to offer flexible sessions and prepare) than component 5 (personal development). Question 6c asks whether the service has a clear policy specifying an allocation of time and resource to spend on CPD activity per week or per month and therefore it is theoretically conceivable that it may load on to either component.

	Component					
Item	**1**	**2**	**3**	**4**	**5**	**6**
3a	0.88					
4a	0.80					
4b	0.76					0.31
4c	0.69	0.32				
1c	0.51				-0.33	
7b		0.82				
7c		0.81				
7d	0.32	0.78				
7a		0.74				
5a			0.85			
5c			0.85			
5b			0.80			
2a				0.73		0.34
2c				0.69		
2b				0.69		
4d	0.30		0.34	0.52		0.36
6c				0.46	0.41	
6b					0.89	
6a					0.85	
1b						0.85
1a						0.78

Table b. Rotated Component Matrix

Appendix 14. The revised questionnaire

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Appendix 15. Journal Guidelines

Cognitive Behaviour Therapy guidelines for authors found here:

https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=sbeh20

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A systematic review of the prevalence of co-occurring Post-Traumatic Stress Disorder and Obsessive-Compulsive Disorder

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Declaration of interest: none.

Highlights:

- There is a paucity of research setting out to investigate the prevalence of co-occurring Post-Traumatic Stress Disorder (PTSD) and Obsessive-Compulsive Disorder (OCD) as a primary aim.
- Small sample sizes and methodological differences have resulted in a wide range of prevalence rates reported.
- There are preliminary indications that some groups demonstrate greater odds of co-occurring PTSD and OCD: namely, women, veterans, and people seeking specialist treatment.
- Available research indicates that OCD may be more strongly linked to PTSD than to trauma.

Abstract

Several studies have indicated that the prevalence of Post-Traumatic Stress Disorder (PTSD) or Obsessive-Compulsive Disorder (OCD) may be higher when the other is present. This paper aimed to systematically review and assess the quality of the literature reporting the prevalence of co-occurrence. Four electronic databases (PsycInfo; PTSDPubs; CINHAL; Medline) were systematically searched for relevant studies using a validated diagnostic measure to establish DSM-IV diagnostic status. Twenty-four studies were identified, and a narrative review of prevalence rates and odds ratios is provided. Risk of bias was assessed using the Joanna Briggs Critical Appraisal Checklist for Prevalence studies and fifteen studies were rated at low to moderate risk of bias. A wide range of current and lifetime prevalence rates were reported among people with primary OCD (Current PTSD: 0%-68.8%; Lifetime PTSD: 1% - 23.5%) and primary PTSD (Current OCD: 7.3% – 48.6%; Lifetime OCD: 13% - 56.9%). The studies provided preliminary evidence that some groups (women, veterans and those seeking specialist treatment) may demonstrate greater odds of co-occurrence and that OCD may be more strongly linked to PTSD than trauma. Methodological variation and small sample sizes precluded an in-depth analysis. This indicates a requirement for future research designed to specifically address this research question.

1.0 Introduction

1.1 Background

Obsessive Compulsive Disorder (OCD) and Post-Traumatic Stress Disorder (PTSD) are common psychological disorders affecting 1.8% and 3.5% of the world population, respectively (American Psychiatric Association [APA], 2013). These figures are prevalence rates: estimates of the proportion of the population affected by a specific disease or disorder. Accurate prevalence estimates are essential for policy development and service planning (Munn et al., 2015). Prevalence estimates of co-occurring psychological disorders can inform our understanding of the relationship between them. This paper aims to summarise and synthesise the research literature pertaining to the prevalence of co-occurring PTSD and OCD.

Posttraumatic Stress Disorder (PTSD) is one of the most common mental health problems to emerge in the weeks or months following trauma. It is characterised by intrusive memories or flashbacks of the traumatic event, high anxiety and avoidance of stimuli related to the traumatic event (APA, 2013). Although broader definitions of trauma exist (Miller & Brock, 2017) the DSM IV and 5 define a traumatic event as one which involves 'actual or threatened death, serious injury, or threat to the physical integrity of self or other' (APA, 2013). Sexual violence is specifically mentioned in the DSM 5 definition (APA, 2013).

Obsessive-Compulsive Disorder (OCD) is similarly characterised by high levels of anxiety along with intrusive or uncontrollable obsessions (intrusive thoughts, urges or images that cause distress) and compulsions (repetitive behaviours or mental acts that one is compelled to perform) (APA, 2013). OCD and PTSD therefore share common features but are distinct psychological disorders. Early descriptions of OCD highlighted the role of "emotional shock" in the development of obsessions and compulsions (Janet, 1903). Modern

cognitive behavioural conceptualisations have similarly highlighted the role of a 'critical incident' in the development of OCD (Salkovskis et al., 1999). A series of case studies have described the concurrent development of OCD and PTSD following a traumatic experiences, in veterans in particular (de Silva & Marks, 1999; Fostick et al., 2012; Pitman, 1993).

The nature of the relationship between co-occurring OCD and PTSD is unclear. Early experiences which foster an inflated sense of responsibility may contribute to the development of OCD (Salkovskis et al., 1999) and it is possible that extreme stress may activate OCD in those with a latent predisposition to OCD (Pitman, 1993). Additionally, Gershuny et al., (2003) suggest that OCD symptoms may serve a protective function in those with PTSD, through helping individuals to cope with trauma-related thoughts and feelings. The associated reduction in anxiety may in turn reinforce obsessive and compulsive behaviours (Briggs & Price, 2009). Over time, obsessions and compulsions may generalise resulting in an experience of OCD which is maintained beyond the experience of trauma and is not necessarily thematically related (Fostick et al., 2012).

1.2 Previous Research

To date, two systematic reviews have explored the relationship between trauma and OCD. Miller and Brock (2017) reviewed studies investigating the association between trauma and OCD and found that trauma was associated with severity of compulsions. They argued that trauma can encapsulate a wide range of distressing experiences (beyond the DSM definition) which do not necessarily result in PTSD. As a result, they included studies investigating a range of adverse or stressful life experiences but excluded studies which measured PTSD alone.

Brander et al. (2016) conducted a wider review of environmental risk factors for the development of OCD. In their paper, trauma and PTSD were discussed separately as risk factors for the development of OCD. They identified five studies investigating the association between PTSD and OCD, specifically. Many of these studies used Odds Ratios (ORs) or Relative Risk Ratio (RRR) as a marker of the association between PTSD and OCD. An OR represents the odds of a condition (e.g. OCD) occurring in the presence or absence of another condition (e.g. PTSD or no PTSD) whereas the RRR represents the probability of developing a condition (e.g. OCD) given a particular exposure (e.g. traumatic event).

Four of the five studies identified by Brander et al. (2016) indicated that individuals with a diagnosis of OCD were more likely to also have PTSD, and a wide range of ORs and RRRs were reported (Boudreaux et al., 1998; Frydman et al., 2014; Lafleur et al., 2011; Maes et al., 2000) . Boudreaux et al. (1998) found that among women recruited from a community setting, those with PTSD were 7.56 times more likely than those without PTSD to have a diagnosis of OCD. Lafleur et al. (2011) found children with OCD were at greater odds of PTSD than children without a diagnosis of OCD (OR: 14.6). Frydman et al., (2014) observed a higher RRR among those who developed OCD over the age of 40, rather than at a younger age (RRR:18.1). Among a sample of motor vehicle and fire accidents survivors, only 1.1% developed OCD, yet all who developed OCD had co-occurring PTSD (Maes et al., 2000).

A third review by Huppert et al., (2005) is the only previous review to summarise prevalence rates among people with primary PTSD (1.6%-75%) or primary OCD (4.2% to 22%). Unfortunately, the authors did not adopt a systematic approach or assess the quality of studies reviewed.

1.3 The Current Review

Cases of concurrent OCD and PTSD are described in the literature (de Silva & Marks, 1999; Fostick et al., 2012; Pitman, 1993) and elevated rates of PTSD have been found among people seeking treatment for OCD (Gershuny et al., 2008) and PTSD (Nacasch et al., 2011; Brown et al., 2001). This has led several authors to suggest there may be a distinct sub-type of 'post-traumatic OCD' characterised by more severe symptoms and greater resistance to treatment (Fontanelle et al., 2012; Gershuny et al., 2008; Pitman, 1993). Some fear treatment of OCD may worsen PTSD symptoms among this group (Gershuny et al., 2003) and others suggest treatment of PTSD may improve co-occurring OCD symptoms (Nijdam et al., 2013). A high prevalence of co-occurrence is also described in information developed by charitable organisations for clinicians and the public (Fletcher et al., 2018; PTSD UK, n.d.). It is not clear whether this information is based on high quality research evidence. It is imperative, as a first step, to establish the prevalence of co-occurring PTSD and OCD.

To date, previous reviews have not adopted a systematic approach (Huppert et al., 2005) and have sought to answer a broader research question (Brander et al., 2016), or applied criteria which excluded relevant studies (Miller & Brock, 2017).

1.4 Aim

This systematic review aims to answer the following question: What is the prevalence of co-occurring PTSD and OCD? The paper will detail:

1. A systematic search of the literature.
2. A quality assessment of the studies identified, using a validated quality appraisal tool.
3. A narrative review of the studies identified.

2.0 Methods and Materials

PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed in the preparation of this review, with the exception of protocol registration (Moher et al., 2009). An expert librarian was consulted for the purposes of selecting databases and devising a search strategy (Boland et al., 2017). Four electronic databases (PsycInfo; Medline; PTSD Pubs formerly PILOTS and CINAHL) were selected according to their relevance to the research question and the likelihood that they would contain non-overlapping content.

Reference management software (Endnote, Clarivate Analytics, 2019) was used to store and de-duplicate references and a systematic review web application (Rayyan, Ouzzani, Hammady, Fedorowicz & Elmangarmid, 2016) was used for screening and selecting relevant papers. The reference lists of selected articles and key reviews (Miller et al., 2017; Brander et al., 2016; Huppert et al., 2005) were then searched for relevant papers. Miller et al., (2017) were contacted to request articles excluded from their review on the basis that they measured PTSD rather than trauma.

2.1 Search Strategy

A primary search strategy was developed and adapted for each database. Search terms were informed by previous systematic reviews (Miller & Brock, 2017; Brander et al., 2016) and the Cochrane Common Mental Disorders team's core search strategies (2014). The search strategy used in PsycInfo is show below, and others are listed in Appendix 1.

1. (Obsessive Compulsive Disorder/ OR compulsi*.ti,ab,id.OR obsessi*.ti,ab,id.OR ocd.ti,ab,id.) AND (Posttraumatic Stress Disorder/ OR Post-Traumatic Stress/ OR post trauma*.ti,ab,id. OR posttrauma*.ti,ab,id. OR post?trauma*.ti,ab,id.OR ptsd ti,ab,id.)

Titles, abstracts, and key words were searched. The search was limited to English language research articles published during or after 1994 (year of publication of the DSM IV) within peer-reviewed journals. These databases were last searched in May 2020.

2.2 Inclusion / Exclusion Criteria

The CoCoPop (Condition, Context and Population) framework was used for the development of the research question (Munn et al., 2018), inclusion and exclusion criteria (Munn et al., 2015). The CoCoPop framework summarises the key elements to consider when formulating a research question specifically relating to questions of prevalence and/or incidence. The framework encourages the thorough specification of the condition (the condition and/or disorder of interest), context (where participants are recruited from) and population (who is recruited) in order to ensure a well-defined research question and clear inclusion/exclusion criteria. A screening and selection tool was developed and piloted with fifty papers leading to some amendments before starting the screening process (Appendix 2). For example, the screening tool was amended to specify study design. A summary of inclusion and exclusion criteria is detailed below.

Studies were included if:

- Recruitment included individuals with a primary diagnosis of OCD or PTSD and reported the degree to which these psychological disorders co-occur.
- They used a validated diagnostic tool to confirm these diagnoses.
- They established a diagnosis of OCD or PTSD using criteria from the DSM IV.
- They adopted a quantitative research design.
- They were published in a peer-reviewed journal.
- They were published after 1994 (DSM-IV publication year).

Studies were excluded if they:

- Did not report the prevalence of co-occurrence of PTSD or OCD.
- Used a diagnostic tool which has not been validated independently or is used in a way which may compromise its validity (e.g. through a translator or interpreter).
- Assessed for the co-occurrence of trauma and OCD, without establishing a diagnosis of PTSD.
- Were published prior to 1994 (year of publication of the DSM IV) and/or established a diagnosis of OCD or PTSD using a different version of the DSM.
- Recruited participants based on a different primary disorder or difficulty (e.g. bipolar disorder), unless prevalence rates were also reported in a control group without the presenting diagnosis.
- Adopted a qualitative research design (including case studies or case series).
- Were published in a journal which was not peer reviewed.
- Were not research articles.
- Were policy documents, dissertations, theses or conference proceedings (or any other publication considered ‘grey literature’)

2.3 Data Extraction

An initial data extraction table was created from a template provided by Boland et al. (2017) and adapted to capture outcomes relevant to the review question. This table was used to extract data from studies relevant to the research question and the quality review process. Items within the data extraction table are shown in Appendix 3.

Studies were sorted according to primary focus on OCD or PTSD whether participants were seeking treatment or not as there are indications that treatment seeking groups may have distinct characteristics (Gavrilovic et al., 2005). Treatment-seeking samples are defined as those recruited on the basis that they access treatment for either PTSD or OCD. Non treatment seeking samples may be recruited from any other setting (including medical) if they are not accessing treatment for PTSD or OCD.

2.4 Quality Assessment

Quality Assessment (QA) tools are typically tailored to a specific research design whereas prevalence data may be obtained from a wide range of study designs. Design-specific tools are not necessarily suitable for QA of studies estimating prevalence (Munn et al., 2014). This review used the Joanna Briggs Institute Critical Appraisal Checklist for Prevalence Studies (JBC) which was developed to support consistent reporting in systematic reviews (Munn et al., 2014) and is the most widely used validated tool designed specifically to assess quality of research studies reporting prevalence data (Borges Migliavaca et al., 2020).

The JBC consists of nine items; rated ‘Yes’, ‘No’ or ‘Somewhat’ (Figure 1). The total score facilitates a comparison of methodological quality. In some reviews using the JBC, studies scoring ‘yes’ on fewer than 50% of items are considered at high risk of bias and therefore have not been considered in depth within the review (Parola et al., 2017). Similarly, other reviews have rated studies as at high, medium and low risk of bias according to the proportion of items with a ‘yes’ score (below 49% = high risk of bias, 50-69% = medium risk of bias, 70% and above = low risk of bias) (Polmann et al., 2019). The second approach is adopted in this review, to facilitate a comparison of methodological quality.

The JBC was piloted with six studies in the current review. This process highlighted that some JBC items were not clearly operationalised. To assure consistency in the application of the measure, these items were further elaborated (Appendix 4). The revised criteria were drawn from previous studies (Reynders et al., 2016) and were developed with respect to the research question and the features of studies reviewed. For example, the pilot highlighted that some authors had not clearly specified whether they were assessing for the presence of current diagnoses, or the presence of the diagnosis over the course of a lifetime. As a result, an additional quality marker was added to the checklist (number 10), and authors were contacted.

A sample of six papers (25%) were quality assessed independently by a second assessor (Boland et al., 2017), a final-year trainee clinical psychologist. A small number of discrepancies were discussed by assessors and resolved, in some cases resulting in further clarification of criteria. For example, discrepant ratings on item 9 (response rate) resulted in clarification that papers not reporting response rates should be rated as ‘unclear’ rather than assuming a 100% response rate.

Some studies indicated that another paper should be accessed for further detail about the study's methodology. In these cases, the JBC score was based on a review of both papers (Boland et al., 2017). Where essential information was not provided, corresponding authors were contacted by email.

[Insert Box 1]

3.0 Results

3.1. Systematic Search

After searching all databases, 2712 references were retrieved. After removing duplicate references, the titles and abstracts of 1478 papers were reviewed for eligibility. Of these, 1419 papers were excluded as they clearly were not relevant to the topic. Fifty-nine full-text papers were reviewed in order to assess eligibility and twenty-two met criteria for inclusion. Manually searching reference lists from these studies identified two further papers.

[Insert Figure 1]

3.2 Summary of papers reviewed

Twenty-four studies were reviewed in total. Prevalence rates are summarised in table 1. Papers are numbered and grouped according to primary diagnosis and whether the samples are treatment seeking or not. Prevalence rates for treatment seeking samples are shown in papers one to nine (primary OCD) and 16-22 (primary PTSD). Prevalence rates for non-treatment seeking samples are summarised in papers 10-12 (primary OCD) and 23-24 (primary PTSD). Papers 13-15 report prevalence rates of both primary OCD and primary PTSD in non-treatment-seeking samples. All studies reported prevalence of one condition (e.g. PTSD) in the presence of another (e.g. OCD) rather than the co-morbidity rate (i.e. percentage of co-occurring PTSD and OCD in a wider sample).

Of the 24 studies reviewed, 12 reported the prevalence rates of PTSD in samples with primary OCD and nine reported the prevalence of OCD in those with a primary diagnosis of PTSD. Three studies reported prevalence rates amongst both samples. More studies recruited treatment-seeking (N=16) than non-treatment seeking samples (N=8). Most studies aimed to report co-morbidities across multiple psychological disorders (N=20). Only four of the studies reviewed investigated the co-occurrence of PTSD and OCD specifically.

Most studies were carried out in the Americas (USA= 10; Brazil= 2; Canada= 1) or Europe (Germany =3; Netherlands = 2; Croatia =1; Switzerland =1). The remaining studies were conducted in Israel (N=2), Morocco (N=1) and New Zeland (N=1). Most studies adopted a cross-sectional research design (N=22), with four analysing cross-sectional data from longitudinal studies (Fontanelle et al., 2012; Pinto et al., 2006; Grabe et al., 2001; Gregory et al., 2016). Two studies adopted a case-control design (Lafleur et al., 2011; Nemcic Moro et al., 2011)

Three studies recruited children and/or adolescents (Lafleur et al., 2011; Verlinden et al., 2015 Essau et al., 2000) and two recruited specific ethnic groups in America; African Americans and Latin Americans (Williams et al., 2016; Pérez-Benítez et al., 2014). Three studies recruited veterans; two of which recruited veterans with a primary diagnosis of PTSD (Knowles et al., 2019; Nemcic Moro et al., 2011) and one which recruited veterans with a primary diagnosis of OCD (Gros et al., 2013). Two studies compared groups with additional psychological disorders. One compared a group with OCD (only), to a group with OCD and hoarding (Boerema et al., 2019). Another compared people with PTSD (only) to another group with PTSD and Disorder of Extreme Stress Not Otherwise Specified (DESNOS) (Nemcic Moro et al., 2011).

[Insert Table 1]

3.3 Quality Assessment

A summary of quality assessment (QA) scores is shown in Table 1. QA scores ranged from two to seven from a possible ten. Six studies were rated at low risk of bias, with a QA score of 7. Of these, three recruited treatment seeking samples with primary OCD (Fontanelle et al., 2012, Gros et al., 2001) or PTSD (Gekker et al., 2018). Three assessed for PTSD and OCD within larger population-based samples (Kadri et al., 2007; Gregory et al., 2007; Gros et al., 2001). Nine studies were rated at high risk of bias, because they had a QA score of four or below. Of these, three recruited specific treatment seeking populations such as Latin Americans (Pérez-Benítez et al., 2014) or Veterans (Knowles et al., 2019, Nemcic Moro et al., 2011) and five recruited wider samples from clinics (Boerema et al., 2019; Lafleur et al., 2011; Hasler et al., 2005; Gallagher & Brown, 2015) or the community (Ruscio et al., 2010).

The JBC assesses for risk of bias across a range of different study types and designs. Among the studies reviewed, there were two main study types: those recruiting individuals seeking treatment and those recruiting individuals who were not seeking treatment. The overall QA score was influenced by this. For example, few of the studies recruiting patients from clinics employed appropriate sample frames or methods, because most recruited convenience samples of patients attending an assessment or treatment clinic. Furthermore, many of these studies did not report 'response rates' as is conventional within epidemiological or population-based research. As a result, few studies recruiting people who were seeking treatment scored 'yes' on items one, two and eight.

For inclusion in this review all studies were required to use a validated diagnostic measure. Nine studies used the Structured Clinical Interview for DSM IV Axis 1 Disorders (First et al., 1996; 1998), six used the Mini International Neuropsychiatric Interview (Sheehan et al., 1998), three used the Anxiety Disorders Interview Schedule (Di Nardo &

Barlow, 1988) and three used the World Health Organisation Composite Diagnostic Interview (WHO CIDI) (Kessler & Üstün, 2004). Two studies used the Schedule for Affective Disorders and Schizophrenia, in their adult (Orvaschel & Puig-Antich, 1987) and child versions (Grabe et al., 1995). The remaining study employed the Diagnostic Interview Schedule (Robins et al., 1989). Processes for establishing a valid and reliable diagnosis varied considerably across studies.

Some studies recruited clinicians to conduct assessments (N=14), some employed interviewers who were not clinically trained (N=6) and others did not specify who conducted the interviews (N=4). Some provided extensive descriptions of staff training and processes to assure reliability, whereas others provided little information (Pinto et al., 2006; Denys et al., 2004; Ruscio et al., 2010; Nacasch et al., 2011) or none (Boerema et al., et al., 2019; Pérez-Benítez et al., 2014; Nemcic Moro et al., 2011; Gregory et al., 2007). Some described the use of consensus agreement among clinicians to establish diagnostic status in complex cases (Grabe et al., 2008;), whereas others were explicit in their reliance of diagnostic algorithms (Ruscio et al., 2010; Grabe et al., 2001; Essau et al., 2000). Variation in each of these areas may have influenced the diagnostic accuracy.

None of the studies estimated the sample size required to establish the prevalence of co-morbid OCD and PTSD. In order to assess whether the study sample sizes were sufficient for this purpose, the current review estimated a minimum sample size of 384, using Daniel's (1999) formula, as described by Naing et al. (2006). On this basis, only three studies had a sufficient sample size for investigating prevalence (Fontanelle et a., 2019; Knowles et al., 2019; Denys et al 2004); all three recruited treatment-seeking populations. Studies recruiting non-treatment seeking populations often recruited a large total sample but identified fewer individuals with a primary diagnosis of interest.

[Insert Table 2]

3.4 Narrative summary of results from samples with primary OCD

3.4.1 Summary of prevalence rates

Prevalence rates amongst treatment and non-treatment seeking samples with primary OCD are illustrated in Graph 1, on the left and right-hand sides, respectively. The majority of rates fall between of 0% (Brown et al., 2001; Grabe et al., 2001) and 23.5% (Grabe et al., 2001) with one much higher rate of 68.8% reported by Gros et al., (2013). Overall, the prevalence rates are higher for lifetime PTSD than for current PTSD.

A wide range of prevalence rates are reported. Graph 1 illustrates a wider range is reported among non-treatment seeking samples (0%-68.8%) than among treatment seeking samples (0%-21.6%). Studies considered at low risk of bias according to JBC criteria are highlighted on the graph and report prevalence rates of between 8.5%-68.8% (Fontanelle et al., 2012; Gros et al., 2013; Kadri et al., 2007; Gregory et al., 2007). Studies considered at high risk of bias have been included for completeness and are indicated with a diamond shape on the graph (Boerema et al., 2019; Lafleur et al., 2011; Hasler et al., 2005; Ruscio et al., 2010). The prevalence rates reported from these studies will not be considered in more detail.

[Insert Graph 1]

3.4.2 Summary of studies at medium to low risk of bias

The highest prevalence rate of 68.8% was reported amongst a population of veterans. Gros et al., (2013) recruited 854 veterans registered with primary care treatment centres. Of 16 veterans who met criteria for OCD, they found that 11 (68.8%) also met criteria for current PTSD. The next highest co-occurrence rate overall, and highest amongst among treatment seeking samples was reported by Fontanelle et al., (2012). Fontanelle et al., (2012) recruited 1001 adults with OCD accessing treatment from seven specialist OCD centres in Brazil and found that 191 (19.1%) had a lifetime diagnosis of PTSD.

Two studies reported zero prevalence amongst treatment seeking (Brown et al., 2001) and non-treatment seeking (Grabe et al., 2001) samples. Brown et al., (2001) recruited 968 individuals accessing assessment and treatment from a specialist treatment centre for mood and anxiety disorders. Seventy-seven presented with an index diagnosis of OCD, meaning that if they had several psychological disorders, OCD symptoms were rated as most severe. None of these individuals met criteria for current PTSD and only one met criteria for lifetime PTSD. However, when all patients presenting with a diagnosis of OCD (including in those who had other psychological disorders which were more severe) were considered, rates of comorbidity were higher: current and (7% of 156) lifetime (11% of 185).

Grabe et al. (2001) recruited 4075 adults living in Germany through drawing a random sample of registration office files and reported prevalence rates by gender (Males: 2045; Females: 2030). Only three males met full diagnostic criteria for OCD, none of whom had co-occurring diagnoses of lifetime PTSD. A total of 17 females met criteria for OCD, of whom four (23.5%) met criteria for PTSD, indicating that women with OCD were seventeen times more likely than a community sample of women without OCD to have experienced PTSD. This study was rated at low risk of bias. A gender difference was also reported by

Williams et al., (2017): among 75 African Americans women were significantly more likely to have a co-occurring diagnosis of PTSD than men (31% compared to 9.4%).

3.4.3 Measures of association among samples with primary OCD.

Six studies recruiting participants with a primary diagnosis of OCD reported Odds Ratios (ORs) or compared prevalence amongst groups. Brown et al., (2001) found that those attending an anxiety/mood disorder clinic with a diagnosis of OCD were significantly more likely to have had a diagnosis of PTSD during their lifetime (OR: 1.64) than those attending the clinic with any other primary mood/anxiety disorder. In a non-treatment seeking sample, Ruscio et al., (2004) estimated the strength of association between OCD and PTSD using a logistic regression and found a significant association between the two (OR: 2.9). Lafleur et al., (2001) compared 263 children with OCD with 151 children without OCD and found that children who had experienced trauma (and did not meet diagnostic criteria for PTSD) were 9.3 times more likely than those who had not experienced trauma to have a diagnosis of OCD. Those who had experienced trauma and met criteria for PTSD were at greater odds again of meeting criteria for OCD (OR: 14.6). The only study not to find an association between OCD and PTSD was Grabe et al., (2008) which found no significant difference in PTSD prevalence between a sample seeking treatment for OCD and a population sample without OCD.

Two studies found that women were at greater odds of co-morbid PTSD. Grabe et al., (2001) found that women with OCD were at greater risk of PTSD than their counterparts without OCD (OR: 17.3), whereas men with OCD were at no greater risk than those without (OR: 0). From their sample of African Americans (N=74), Williams et al., (2017) found that

females (12/42 or 31%) were more likely than males (2/32 or 9.4%) to have a co-morbid diagnosis of PTSD ($z=2.2$, $p<0.05$).

Two studies compared the severity of OCD between groups. Lafleur et al (2001) found that scores on specific subscales of the Children's Yale-Brown Obsessive-Compulsive Scale were higher among those with a co-morbid diagnosis of OCD and PTSD than those with OCD only. These included the obsession-interference and distress subscales and the compulsion distress and control subscales. Fontanelle et al., (2012) divided their large sample into those with non-traumatic OCD (NT-OCD), pre-traumatic OCD (PreT-OCD) and post-traumatic OCD (PostT-OCD). The PostT-OCD group were significantly different from others across a wide range of measures. They were significantly older, scored at a higher rate and severity on all subscales of the Dimensional Yale-Brown Obsessive Compulsive Scale (apart from one), scored higher on measures of depression, anxiety and more frequently on several items relating to suicidality.

Three studies reported information on the sequence of OCD and PTSD. In their sample of 75, Ruscio et al., (2004) found that the majority (60%) of cases developed OCD in the same year as PTSD, or in the years after it. Similarly, Lafleur (2001) found that symptoms of PTSD preceded OCD in half their sample with co-morbid PTSD and OCD. In the other half of the sample, PTSD typically developed within months of the onset of OCD. Brown et al. (2001) found that in those with an index diagnosis of PTSD (N=20) a majority (55%) develop OCD in the same or year or the year after they develop PTSD.

3.4.4. Conclusion

The studies reviewed indicated that prevalence rates of PTSD among those with OCD vary considerably across studies. These figures should be interpreted with caution due to

methodological differences across studies. For example, the studies reviewed recruited qualitatively different samples: population-based samples (Grabe et al., 2001), clinical samples seeking treatment within a mood/anxiety disorder clinic (Brown et al., 2001) or specialist OCD centres (Fontanelle et al., 2012), and veterans (Gros et al., 2001). Populations accessing specialist treatment may have more severe and chronic problems and veteran samples are more likely to have experienced trauma. It is also worth noting that studies reporting the most extreme scores (0% or 68.8%) and gendered differences, did so in the context of small samples and therefore should be interpreted with caution. Fontanelle et al., (2012) and Gros et al (2001) are the only studies at low risk of bias to have recruited an adequate sample. They reported prevalence rates of PTSD as 19.1%, 0% (among men) and 23.5% (among women). Only Grabe et al., (2001) compared rates across genders. Some of the studies reviewed indicate that over half of individuals with co-occurring diagnoses develop OCD at the same time or after PTSD (Ruscio et al., 2004; Lafleur et al., 2001; Brown et al., 2001). There is preliminary evidence that this group is at risk of severe symptoms and greater co-morbidity (Fontanelle et al., 2012).

This concludes a summary of prevalence estimates from studies recruiting individuals with primary OCD. The next section summarises prevalence estimates from studies recruiting individuals with primary PTSD.

3.5. Narrative summary of results from samples with primary PTSD

3.5.1. Summary of prevalence rates

The prevalence rates of OCD in samples with a primary diagnosis of PTSD are shown in Figure 2. Again, they show wide variation. The lowest and highest (2.2%-56.8%) prevalence rates are reported in treatment-seeking samples (Gekker et al., 2018; Pérez-Benítez et al., 2014) with a narrower range (6.6%-17.6%) reported among non-treatment seeking samples (Kupchik et al., 2007; Essau et al., 2000). Overall prevalence rates were higher in studies assessing for lifetime diagnoses of OCD than in studies assessing for the presence of a current diagnosis. Studies reporting the lowest prevalence rates of between 2.2% to 3.6% were all rated at high risk of bias with JBC ratings of four or below (Pérez-Benítez et al., 2014; Knowles et al., 2019; Nemcic Moro et al., 2011). These studies recruited specific populations (e.g. veterans; Latin Americans) seeking treatment for PTSD. Only studies at medium and low risk of bias, indicated by a QA score of above four, will be considered further in this review.

[Insert Graph 2]

3.5.2 Summary of studies at medium to low risk of bias

The highest prevalence rate was reported by the only study recruiting a treatment-seeking population at low risk of bias. Gekker et al., (2019) recruited 109 adults with a history of trauma attending a specialist treatment programme for PTSD. They reported high rates of current (48.6%, N=53) and lifetime (56.9%, N=62) OCD. Nacasch et al., (2011) similarly recruited patients seeking specialist treatment for PTSD and found that 41% (18) of 44 also met diagnostic criteria for OCD.

Among those attending Brown et al.'s (2001) anxiety and mood disorder clinic with a primary diagnosis of PTSD (i.e. where PTSD was the most severe psychological disorder: N=13), three (23%) and four (31%) met criteria for current and lifetime OCD respectively. When they assessed prevalence rates among all patients with a diagnosis of PTSD (whether it is their most severe psychological disorder or not), amongst a larger sample (82) prevalence rates of 22% (current) and 24% (lifetime) were reported. Among treatment-seeking samples, the lowest reported rate of OCD (7.3%) was found among children with a diagnosis of PTSD (N= 178) recruited from child welfare and trauma centres (Verlinden et al., 2015).

In contrast, among non-treatment seeking samples, the highest rate was reported in a study recruiting children and adolescents. Essau et al. (2000) recruited children and adolescents at random from schools in Northern Germany. Of the small number of children and adolescents meeting criteria for PTSD (N=17), three also met criteria for OCD (17.6%). The lowest prevalence rate among non-treatment seeking samples was reported by Kupchik et al (2007). They recruited individuals who had a diagnosis of PTSD due to a motor vehicle accident (N=30) and found that only two (6.6%) had a co-occurring diagnosis of OCD. Both studies were rated at medium risk of bias.

Among studies recruiting non-treatment seeking populations, only two were considered at low risk of bias. Kadri et al., (2007) recruited a stratified sample of the population of Casablanca (N=800) and found that 14.8% of those identified with PTSD also met criteria for OCD. Gregory et al., (2007) recruited 96% of the population of Dunedin, New Zeland born in 1972-1973. Of those identified with a primary diagnosis of PTSD (N=23), three (13%) also had a diagnosis of OCD.

3.5.3 Measures of Association amongst samples with primary PTSD.

Four studies recruiting participants with a primary diagnosis of PTSD reported Odds Ratios (ORs), Relative Risk Ratios, or compared prevalence amongst groups. Brown et al., (2001) found that individuals presenting with primary PTSD (as the most severe presenting diagnosis) were at significantly greater odds of a diagnosis of OCD (Current: 3.62; Lifetime: 3.54) than people presenting with other mood and anxiety disorders. When everyone with a diagnosis of PTSD was considered (even if it was not their most severe diagnosis), the odds ratio was lower (1.54) but still significantly greater than those presenting with other mood and anxiety disorders. On the other hand, among a non-treatment seeking population the relative risk of OCD was not significantly greater among those with PTSD than those without (Rodriguez et al., 2004).

Kupchik et al., (2007) and Pérez-Benítez et al., (2014) compared rates of OCD amongst those with and without PTSD, recruiting survivors of motor vehicle accidents and Latin Americans respectively. Both studies recruited relatively small samples (N=60; N=150) and found no difference between those with and without PTSD in their rate of OCD. Knowles et al., (2019) recruited a larger sample of veterans with PTSD (N=867) and found that OCD is significantly more prevalent amongst veterans with PTSD (6%) than those without PTSD

(3.6%). It should be noted that Knowles et al's (2019) prevalence estimates were excluded from detailed consideration primarily due to inadequate reporting rather than methodological weaknesses as they were not explicit about the time-frame measured and reported the overall percentage without reporting the numerator.

3.5.4. Conclusion

These studies report a wide range of prevalence rates among samples with primary PTSD, similar to the wide range found among samples with primary OCD. They suggest that rates of co-morbidity may be higher amongst treatment seeking samples – particularly among groups seeking specialist treatment for PTSD. However, of all studies, only one (Knowles et al., 2019) had a sample large enough to make an estimate of prevalence.

Through reviewing the prevalence rates alone it would appear that the prevalence of OCD may be higher in children meeting diagnostic criteria for PTSD recruited from schools (Essau et al., 2000), than in those seeking treatment for PTSD (Verlinden et al., 2015). However, there are several differences between studies which might contribute to the differences reported. Firstly, it is possible that the rates reported by Essau et al.,(2000) are at greater risk of bias due to the small number of children with PTSD identified (N=23) compared with Verlinden et al. (2015) (N=178). Furthermore, Essau et al's., (2000) sample was younger than Verninden et al.,'s (2015) (Average age of 12.8 vs 14.3) which could account for the lower levels of co-morbid OCD reported. Finally, the studies also adopted different methods for diagnosis: children recruited seeking specialist treatment were assessed by child psychologists with extensive experience working with trauma. The children recruited from schools were assessed using a measure administered by lay-interviewers, and diagnoses were

calculated using a statistical programme. Due to these methodological differences, no clear comparison can be drawn.

Studies which analysed the association between OCD and PTSD were inconsistent in their findings. However, these inconsistencies may reflect differences across the populations recruited. It is possible that individuals accessing specialist treatment for PTSD may have significantly greater odds of experiencing OCD (Brown et al., 2001) and those identified in the community are not (Rodriguez et al., 2004). Furthermore, veterans with PTSD may be a specific group at greater risk of co-morbidity, due to an increased likelihood of experiencing psychological trauma (Knowles et al., 2019).

4.0 Discussion

4.1 Summary of key findings

This is the first systematic review of the literature investigating the prevalence of co-occurring PTSD and OCD. The review has highlighted great methodological variation across studies and with a large proportion of studies at high risk of bias (37.5%). Only four of the studies reviewed investigated the prevalence of co-occurring PTSD and OCD specifically. Due to the wide variation in methodology and quality, tentative conclusions are made.

Overall, this review indicates that the prevalence of OCD or PTSD is higher when the other is present. Among community samples, it appears that people with OCD are more likely than those without OCD to have a co-occurring diagnosis of PTSD (Grabe et al., 2001). Furthermore, populations seeking specialist treatment for either OCD or PTSD report higher rates of co-occurrence again. Rates and odds of co-occurrence are highest among those seeking treatment for PTSD (Gekker et al., 2018; Brown et al., 2001) and heightened rates of co-occurrence are also seen in those seeking treatment for OCD (Brown et al., 2001). Some papers provide preliminary evidence that co-morbidity may be greater among certain groups, including women (Grabe et al., 2001, Williams et al., 2017) and veterans (Gros et al., 2001; Knowles et al., 2019).

Some studies indicate that PTSD may be more strongly associated with OCD than a traumatic experience alone. Three studies found higher rates of OCD among those with a diagnosis of PTSD than among those who had experienced trauma but did not meet criteria for PTSD (Lafleur, 2001.; Verlinden et al., 2005; Knowles et al., 2019) and two found a statistically significant difference between these groups (Lafleur, 2001; Knowles et al., 2019).

Three studies indicated that in a majority of cases, symptoms of PTSD developed prior to, or in tandem with symptoms of OCD (Lafleur et al., 2011, Brown et al., 2001,

Ruscio et al., 2010). Two studies indicated that symptoms of OCD (as measured by the Yale-Brown Obsessive Compulsive Scale) may be more severe when PTSD and OCD co-occur (Lafleur et al., 2001; Fontanelle et al., 2012) and particularly when PTSD develops first. Fontanelle et al. (2012) distinguished between those who developed OCD before and after PTSD and found that the latter report greater levels of anxiety, depression, and suicidality.

4.2 Contextualising the findings within the existing literature

Prior to this review, only Huppert et al. (2005) and Brander et al. (2016) had reviewed the literature into the prevalence of co-occurring OCD and PTSD. This review is broadly consistent with Brander et al.'s (2016) conclusion that a diagnosis of PTSD appears to be a risk factor for the development of OCD. Huppert et al. (2005) similarly identified a wide range of prevalence rates. They found a wider range of prevalence rates in those with a primary diagnosis of PTSD (1.6%-75%) than in those with a primary diagnosis of OCD (4.2% to 22%); a pattern is broadly mirrored in the current review. The increased prevalence observed in the current review among treatment seeking groups is consistent with previous research and may be due to several factors such as the severity of symptoms, severity of the traumatic event and demographic characteristics (Gavrilovic et al., 2005).

This review is preceded by several case studies describing the emergence of OCD and PTSD following a traumatic event (de Silva & Marks, 1999; Fostick et al., 2012; Pitman, 1993). Many describe the emergence of OCD in veterans who have sought treatment for PTSD, a population also recruited by three of the studies reviewed. One of the studies reviewed indicated that veterans with PTSD were more likely than those without PTSD to have a co-occurring diagnosis of OCD (Knowles et al., 2019). Another found that although

only a small proportion of veterans recruited met criteria for OCD, a large proportion of those also met criteria for PTSD (Gros et al., 2001).

In line with this review, Miller et al., (2017) found that the relationship between trauma exposure and OCS is mediated by gender. Miller (2017) found that studies recruiting more females reported a stronger relationship between trauma exposure and OCS. Epidemiological research has previously indicated that females experience higher rates of most anxiety disorders (McLean et al., 2011). However, these results indicate that the odds of co-morbid PTSD are greater among women with OCD, than among women with any other anxiety disorder (Grabe et al., 2001).

Williams et al., (2017) indicate that their findings are consistent with the higher rates of PTSD reported among African American females in general (Himle, Baser, Taylor, Campbell, & Jackson, 2009) and reflect a greater risk of traumatization among this population and therefore increased risk of further psychological disorders. Miller et al., (2017) alternatively hypothesise that the association between OCD and PTSD among women may be mediated by a greater tendency to perceive traumatic incidents as threatening (Irish et al., 2011) and appraise events with fear (Norris et al., 2002).

A recent review (Miller et al., 2017) found a small but significant association between traumatic experiences (rather than PTSD) and obsessive-compulsive symptoms (OCS) independently of the development of PTSD. They searched for research recruiting people who had experienced a broad range of trauma and excluded papers using measures of PTSD (unless there was also a measure of trauma). As such, these reviews did not contain any of the same papers.

This review found that the presence of PTSD may affect the strength or nature of the association between trauma exposure and OCD. Studies reporting the highest co-occurrence

rates (60%-75%) in Huppert et al.'s (2005) paper recruited individuals exposed to specific traumatic events with a primary diagnosis of PTSD. Similarly, the highest co-occurrence rates reported in the current review (44%-68.8%) were reported in people exposed to events which involved actual or threatened death, serious injury or sexual violence (Gekker et al., 2018; Nacasch et al., 2017; Gros et al., 2013). This may be due to the nature of the traumatic event and/ or to the development of PTSD in response to the trauma. A diagnosis of PTSD may provide further explanatory value as it reflects an individual's response to a traumatic event rather than describing the presence of a traumatic event alone.

4.3 Strengths and Limitations

This is the first comprehensive, systematic review of this topic which includes a quality assessment process. The QA tool chosen can be applied to several different study designs and facilitated comparison between studies adopting different research designs and follows practice in the wider literature (Borges Migliavaca et al., 2020). However, many of the items in the JBC are not clearly operationalised and required clarification (Appendix 2).

The studies reviewed differed in approach (clinical or epidemiological), samples selected (treatment-seeking, non-treatment seeking, specific groups) and focus (e.g. on one disorder or patterns across multiple disorders). This wide range of study types provide an initial basis for considering how prevalence rates may vary across populations but limit the degree to which reliable and accurate prevalence estimates can be made. In particular, due to the small sample sizes and wide variety of methodologies a meta-analysis may have generated misleading results (Munn et al., 2015) and a narrative review was necessary.

There are two key factors which should be borne in mind when interpreting the data. Firstly, of the studies reviewed, only three were deemed to have a sufficient sample size.

Studies recruiting non-treatment seeking populations were particularly limited by small sample sizes; six out of nine prevalence rates reported were based on a sample size of 30 or below. Furthermore, several studies were not clear about whether the prevalence rates reflected current or lifetime co-occurrence. Six authors were contacted, and, in some cases, time-period was inferred by the measure used. It was not possible to infer this in the cases of three papers.

Secondly, selecting studies which used validated research instruments enhanced the validity of comparisons made but the clinical experience and training provided to assessors varied greatly. OCD and PTSD share core features (such as intrusive thoughts and avoidance) which may be distinguished by nuances in content. For example, in PTSD, intrusive thoughts tend to be linked to past events, with avoidance serving to protect from reminders of trauma. In OCD, intrusive thoughts are more likely to be future oriented with avoidance serving to protect from feared consequences (Rossi et al., 2020).

When completing OCD and PTSD self-report measures, individuals who have experienced trauma tend to endorse conceptually or symptomatically related items (Franklin & Raines, 2019). Lay interviewers applying measures which rely on symptom count and diagnostic algorithms may be ill equipped to tease apart core symptoms characteristic of both disorders. Grabe et al., (2008) suggest that their rigorous approach to assessment, including comprehensive supervision and consensus agreement processes in complex cases may account for the lower prevalence rate reported in their study.

4.4 Conclusions and future directions

Tentative conclusions are drawn from this review due to the wide range of methodological approaches adopted and prevalence rates reported. Firstly, some studies

indicate that specific groups may be at heightened risk of co-occurring OCD and PTSD: women, veterans and those seeking treatment for OCD or PTSD.

To gain a better estimate of the true prevalence of co-occurring OCD and PTSD, future research should focus on improving methodological processes and reporting. For example, studies should estimate the sample size required to answer this research question. Attention to processes for assuring the reliability of assessment and generalisability of results (e.g. through reporting response rate) would improve the quality of evidence generated. Furthermore, an investigation or comparison of diagnostic procedures (e.g. clinical judgement vs diagnostic algorithm) and whether they influence rates of co-morbidity will be required to establish whether inflated co-morbidity rates are a product of diagnostic overlap rather than comorbidity.

This paper reaches the tentative conclusion that some groups may be at heightened risk of co-morbid OCD and PTSD. Co-morbidity is associated with more severe symptoms and poor treatment response. As such, these populations may benefit from a thorough assessment made by a clinician with experience of co-morbidity. The presence or absence of co-morbidity should be established through a comprehensive formulation which considers the provenance, development, nature, and function of symptoms. A thorough assessment of co-morbidity should therefore inform the most appropriate intervention.

This review therefore recommends methodological consistency in future research to accurately establish the prevalence of co-occurring PTSD and OCD. Establishing prevalence estimates for treatment seeking samples will support the effective planning of services and treatment.

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Tables and Figures

Joanna Briggs Critical Appraisal Checklist for Prevalence Studies

1. Was the sample frame appropriate to address the target population?
2. Were study participants sampled in an appropriate way?
3. Was the sample size adequate?
4. Were the study subjects and the setting described in detail?
5. Was the data analysis conducted with sufficient coverage of the identified sample?
6. Were valid methods used for the identification of the condition?
7. Was the condition measured in a standard, reliable way for all participants?
8. Was there appropriate statistical analysis?
9. Was the response rate adequate, and if not, was the low response rate managed appropriately?
10. Was the study explicit in the timeframe of data captured? (Supplemental question)

Box 1. Joanna Briggs Critical Appraisal Checklist for Prevalence Studies

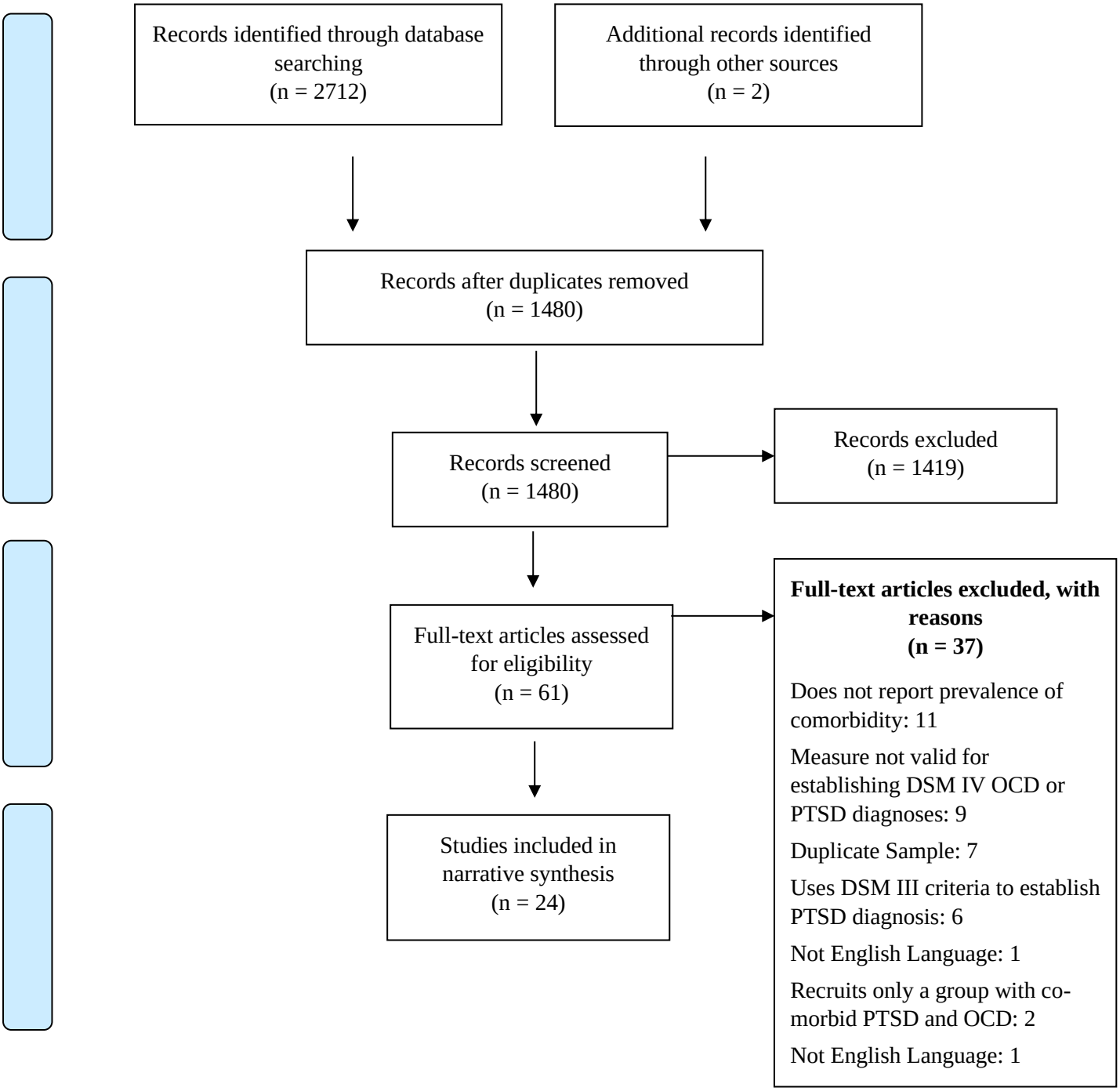
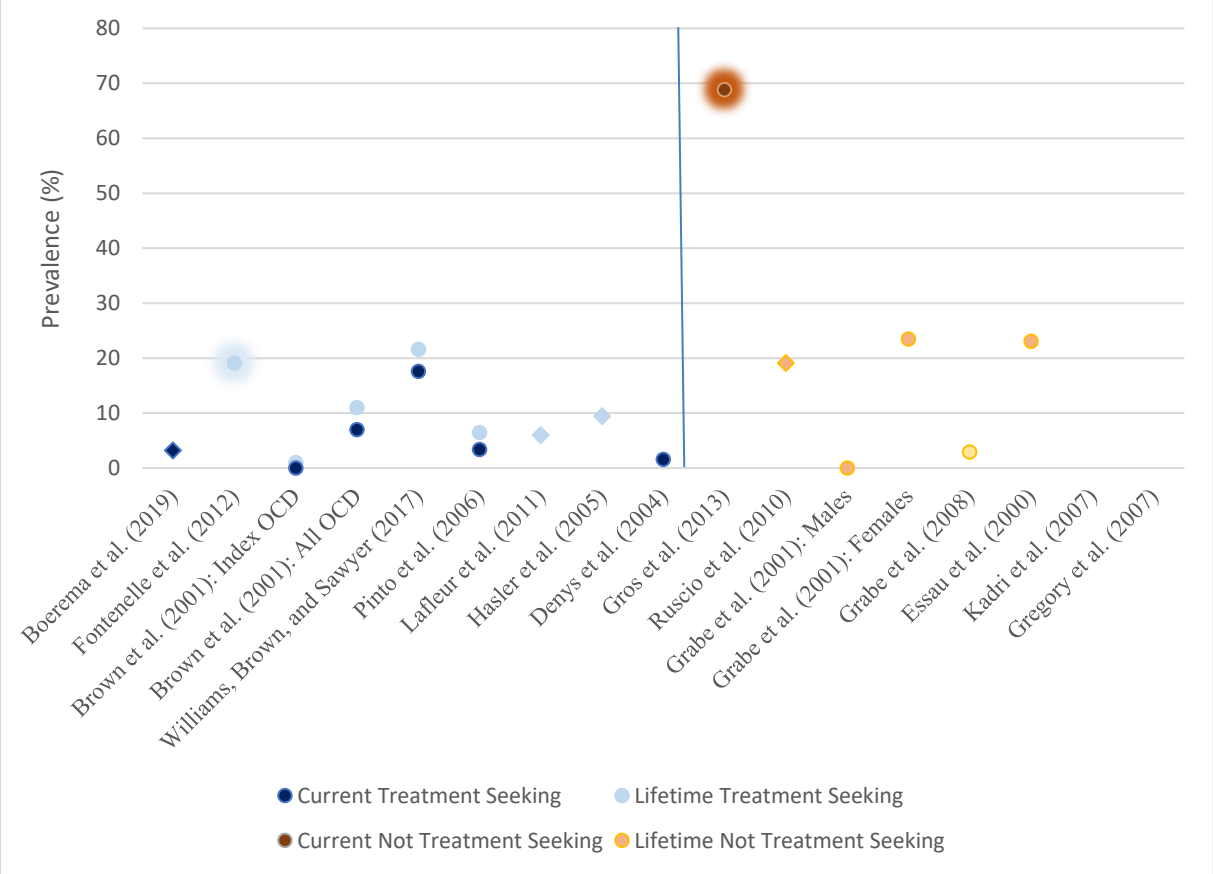
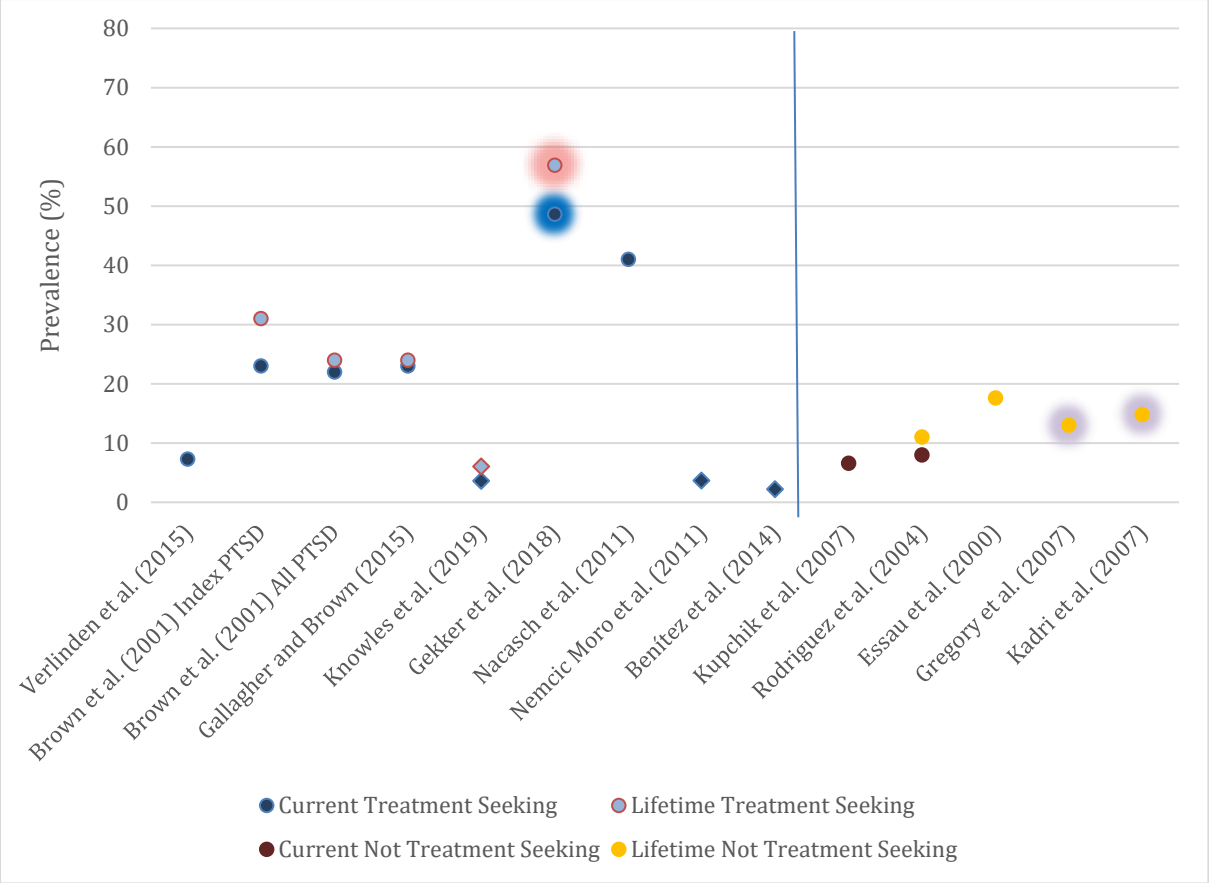


Figure 1. Prisma Flow Diagram



Graph 1. Prevalence of PTSD among populations with primary OCD. Prevalence rates for treatment seeking samples are shown to the left of the blue and prevalence rates from non-treatment-seeking samples, are shown to the right of the blue line. Studies at low risk of bias are highlighted and appear larger on the graph. Studies at high risk of bias (with a quality assessment score of four or below) are indicated with diamond shapes.



Graph 2. Prevalence of OCD among populations with primary PTSD. Prevalence rates for treatment seeking samples are shown to the left of the blue and prevalence rates from non-treatment-seeking samples, are shown to the right of the blue line. Studies at low risk of bias are highlighted and appear larger on the graph. Studies at high risk of bias (with a quality assessment score of four or below) are indicated with diamond shapes.

	Author	Design	Country	Study Type	Population	Recruitment and response rate	Time-frame	Measure	Prevalence Rate (Proportion, %)	Odds Ratio/ Relative Risk and other relevant results
1	*Boerema et al., (2019)*	Cross-sectional	Netherlands	OCD Treatment Seeking	Adults with current (91.2%) and remitted (8.8%) OCD aged 18-79 with and without hoarding characteristics.	419 participants recruited from 7 mental health centres between 2005-2009. Response rate of 61%.	Not Specified	Structured Clinical Interviews on DSM-IV axis I diagnoses (SCID-I/P) (First et al., 1996)	**Prevalence:** OCD without hoarding = **3.2%** (11/349). OCD with hoarding = 3.4% (2/58)	**Odds Ratio (OR):** PTSD with OCD and hoarding: 1.1 (0.24-5.08) p=.91. Not significantly different from OR of PTSD in OCD without hoarding.
2	*Fontenelle et al. (2012)Fontenelle et al. (2012)Fontenelle et al. (2012)*	Cross-Sectional	Brazil	OCD Treatment Seeking	Adults with a primary diagnosis of OCD	1001 patients with OCD attending any of seven specialist OCD centres across five different Brazilian regions and three different states between August 2003-2009. No response rate reported.	Lifetime	Structured Clinical Interviews on DSM-IV axis I diagnoses (SCID-I/P) (First et al., 1996)	**Prevalence:** 19.1% (191/1001)	**Symptom Severity:** Compared sub-groups with non-traumatic OCD, pre-traumatic OCD and post-traumatic OCD (PT-OCD). The PT-OCD group were older and showed significantly higher rate and severity of scores on the dimensional yale-brown obsessive compulsive scale ($p<0.05$) across almost all dimensions. PT-OCD also scored higher on measures of depression and anxiety ($p=.001$) and endorsed items related to suicidality more frequently.
3	*Brown et al. (2001)*	Cross-Sectional	USA	OCD Treatment Seeking (a) and PTSD Treatment Seeking (b)	Adults aged between 18-65 who present with a mood or anxiety disorder.	1,127 patients presenting for assessment and treatment at the Center for Stress and Anxiety Disorders (CARD) situated at the University of Albany (n = 412) and Boston University (n = 715). Participants were assessed for eligibility in initial telephone screening and then invited for diagnostic	Current & Lifetime	Anxiety Disorder Interview Schedule for DSM-IV Lifetime Version (Di Nardo, Brown & Barlow, 1994)	***a.Primary OCD Sample*** **Prevalence of:** **1.Current Additional Diagnoses (N=968):** 0% (0/77) **2.Additional Lifetime Diagnoses (N=968):** 1% (1/77) **3.Overall percentage of co-occurance of anxiety/mood (N=1127):** 7% (11/156) 4.**Overall**	***a.Primary OCD Sample*** **Odds Ratio (OR):** 1. 0.59 -Not Significant (NS) 2. 0.22 (NS) 3. 1.8 (NS) 4. 1.64 ($p<0.05$). ***b.Primary PTSD Sample*** **Odds Ratios:** 1.3.62 ($P<0.05$) 2.3.54 ($P<0.05$) 3.1.67 (NS) 4.1.54 ($P<0.05$)

	Author	Design	Country	Study Type	Population	Recruitment and response rate	Time-frame	Measure	Prevalence Rate (Proportion, %)	Odds Ratio/ Relative Risk and other relevant results
						interview. No response rate reported.			**percentage of co-occurance of lifetime anxiety/mood disorders (N=1127):** 11% (20/185) ***b.Primary PTSD Sample*** **1.N=968 - Current Additional Diagnoses:** 23% (3/13) **2.N=968 - Additional Lifetime Diagnoses:** 31% (4/13) **3.N=1127 - Overall percentage of co-occurrence of anxiety/mood:** PTSD: 22% (11/49) **4.N=1127 - Overall percentage of co-occurrence of lifetime anxiety/mood disorders:** PTSD= 24% (20/82)	**Sequence:** In those presenting with an index (most severe diagnosis) of primary PTSD (N=20) a majority (55%) develop OCD in the same or following year that they develop primary PTSD.
4	*Williams, Brown, and Sawyer (2017)*	Cross-Sectional	USA	OCD Treatment Seeking	African American adults with a lifetime diagnosis of OCD.	75 participants were recruited via clinical referral, advertisement, and community outreach at the Center for the Treatment and Study of Anxiety, University of Pennsylvania. No response rate reported.	Current & Lifetime	Structured Clinical Interview for DSM-IV Axis I Disorders (SCID; First, Spitzer, Gibbon, & Williams, 2002).	**Prevalence:** Current: 17.6% (N=13/75); Lifetime: 21.6% (N=16/75)	**Gender:** Females more likely to have co-occurring PTSD and OCD than males z=2.2* **(**F: 13/42 (31%) M:3/32 (9.4%))
5	*Pinto, Mancebo, Eisen, Pagano, and Rasmussen (2006)*	Cross-Sectional	USA	OCD Treatment Seeking	Adults aged 19 or older with a primary diagnosis of OCD (Current=81%,	293 consecutive patients were recruited from psychiatric treatment settings (including an outpatient OCD	Current & Lifetime	Structured Clinical Interviews on DSM-IV axis I diagnoses (SCID-	Current: 3.4% (N=10/293) Lifetime: 6.5% (N=19/293)	**Other:** Rates of PTSD did not differ between those with early onset OCD (<18) and those with late onset OCD (>18).

	Author	Design	Country	Study Type	Population	Recruitment and response rate	Time-frame	Measure	Prevalence Rate (Proportion, %)	Odds Ratio/ Relative Risk and other relevant results
					partial remission 17%, 2% full remission) seeking treatment for OCD.	specialty clinic; inpatient units of a private psychiatric hospital; community mental health centers; 2 general outpatient psychiatric clinics; the private practices of 3 experts in cognitive-behavioral therapy for OCD). 91% were participating in outpatient treatment,4% were inpatient, 5% were not in treatment. 79% of those screened met inclusion criteria and were enrolled in the study.		I/P) (First et al., 1996)		
6	*D. L. Lafleur et al. (2011)D. L. Lafleur et al. (2011)Lafleur et al., (2011)*	Cross-Sectional	Canada	OCD Treatment Seeking	Children and adolescents with a diagnosis of OCD	266 children and adolescents recruited from a genetic study of paediatric OCD (N=130) and OCD clinic patients (N=133). No further information on recruitment or response rate.	Lifetime (not clearly specified)	Kiddie SADS-E (Epidemiologic Version) for DSM IV (OCD) and DSM III (control group)	Control: PTSD rate: 0% (0/151) OCD: PTSD rate 6% (17/263)	**Odds Ratio:** 14.6* (odds ratio=14.6, 95%CI=[2.5, symbol]p<.001) **OCD Severity:** Scores on some Children's Yale-Brown Obsessive-Compulsive Scale subscales (obsession-interference and distress and compulsion distress and control) were significantly higher among children with co-morbid PTSD than those with OCD alone. **Sequence:** In half of those with PTSD and OCD, OCD developed concurrently or after PTSD. In the remaining group, PTSD developed within months of OCD.

	Author	Design	Country	Study Type	Population	Recruitment and response rate	Time-frame	Measure	Prevalence Rate (Proportion, %)	Odds Ratio/ Relative Risk and other relevant results
7	*Hasler et al., (2005)*	Cross-Sectional	USA	OCD Treatment Seeking	Outpatients at an adult OCD clinic	317 outpatients recruited from an Adult OCD Clinic via clinician referral and online and newspaper advertisement, advertisement at information booths. Does not specify response rate.	Lifetime (not clearly specified)	Structured Clinical Interview for DSM-IV (First et al., 2001).	**9.4%** I25/275)	**Odds Ratio:** OR was calculated for a diagnosis of PTSD across the four different OCD symptom dimensions. No significant differences found.
8	Denys, Tenney, van Megen, de Geus, and Westenberg (2004)	Cross-Sectional	Switzerland	OCD Treatment Seeking	Adult outpatients seeking specialist treatment for OCD.	Recruited 420 consecutive patients with a diagnosis of OCD between 1997-2002 from anxiety research unit at the University Medical Centre of Utrecht.	Current	Mini International Neuropsychiatric Interview (Sheehan et al, 1998)	**1.6%**	
9	*Grabe et al., (2008)*	Cross-Sectional	Germany	OCD Treatment Seeking	Adults with OCD	210 adults with OCD were recruited from four psychiatric university hospitals in Germany. No response rate reported.	Lifetime	German version of Schedule for Affective Disorders and Schizophrenia – Lifetime Anxiety (SADS-LA-IV)	PTSD: **2.9%** (6/197) Controls: **4.5%** (6/122)	The OCD group did not differ from control group according to the rate of lifetime diagnoses for PTSD (X2 = 0.6, d.f. = 1, p = 0.42)
10	*Gros, Magruder, & Frueh (2013)*	Cross-Sectional	USA	OCD Non-Treatment Seeking	Adult veterans attending primary care appointments	854 veterans selected from a master-list of patients attending one of four veterans primary care centres. 74% asked took part in a baseline interview and 74.9% of those who completed the baseline interview took part in the MINI.	Current	Mini International Neuropsychiatric Interview (Sheehan et al, 1998)	**68.8%** (N=11/16 with OCD) Total Sample: 854	-
11	*Ruscio et al. (2010)*	Cross-Sectional	USA	OCD Non-Treatment Seeking	English speaking adults aged 18 or older in living in	Feb 2001 – April 2003. A probability sub-sample (N=5697) of	Lifetime	Version 3.0 of the World Health Organization	**19.1%** (out of N=73)	**Odds Ratio:** 2.9* (1.6-5.4) estimated in logistic regression (p<0.05).

	Author	Design	Country	Study Type	Population	Recruitment and response rate	Time-frame	Measure	Prevalence Rate (Proportion, %)	Odds Ratio/ Relative Risk and other relevant results
					coterminous USA.	respondents of a nationally representative survey (NCS-R) (which had a response rate of 70.9%, N=9282) were assessed for psychiatric disorders. Of these, OCD was assessed in a random 30% sample of the sub-sample (N=2073). The probability samples were weighted to adjust for oversampling to ensure representativeness.		Composite International Diagnostic Interview (CIDI 3.0)		**Sequence:** OCD began in the same year as PTSD (20.7%) and followed OCD (39.4) as often as preceding it (39.9). OCD was one of the only anxiety disorders not to predict later PTSD.
12	*Grabe et al., (2001)*	Cross – Sectional	Germany	OCD Non-Treatment Seeking	Adult German National residents of Lubek, Germany and 46 neighbouring communities.	A random sample of registration office files from each area were selected, between July 1996-March 1997, resulting in a total sample of 4075 (**Males**:2045; **Females** 2030). Response rate: 70.2%.	Lifetime	A modified and extended version of the World Health Organization Composite International Diagnostic Interview (Robins et al., 1998) adapted to DSM IV (M-CIDI (Wittchen et al., 1995)	**Males:** Full OCD: 0% (0/3) / Sub-clinical OCD: 2.9% (N=1/35); **Females:** Full OCD: 23.5% (N=4/17)/ Sub-clinical OCD (N=1/43): 2.3%	Odds ratio of PTSD in sample with OCD (compared with population without OCD): **Males:** Full: 0 (NS) Sub: 5.6 (NS) **Females:** Full: **17.3 ($p<0.05$)** Sub: 1.1 (NS)
13	*Essau et al. (2000)*	Cross-Sectional	Bramen, Germany	OCD Non-Treatment Seeking (a) and PTSD Non-Treatment Seeking (b)	German adolescents aged 12-17 years attending secondary school.	1035 adolescents were randomly selected from 36 schools in the province of Bremen, in northern Germany.	Lifetime	The computerised Composite International Diagnostic Interview (CAPI; Wittchen & Pfister, 1996).	***a.Primary OCD Sample*** Prevalence of PTSD: 23.1% (3/13) ***b.Primary PTSD Sample*** Prevalence of OCD: 17.6% (3)	-

	Author	Design	Country	Study Type	Population	Recruitment and response rate	Time-frame	Measure	Prevalence Rate (Proportion, %)	Odds Ratio/ Relative Risk and other relevant results
14	*Kadri et al. (2007)*	Cross Sectional	Morocco	OCD Non-Treatment Seeking (a) and PTSD Non-Treatment Seeking (b)	Residents of eight prefectorats of Casablanca aged 15 or older.	800 participants were randomly selecting using a systematic sampling procedure, with reference to the national census. The sample was stratified according to gender and prefectorats, then streets, blocks and households were randomly selected, with one family member chosen per household. 91.6% took part. Those who refused to participate were not replaced.	Current (in past month)	Validated Moroccan language version of the Mini International Neuropsychiatric Interview (Sheehan et al, 1998)	***a.Primary OCD Sample*** Prevalence of PTSD: 8.5% ***b.Primary PTSD Sample*** Prevalence of OCD: 14.8%	-
15	*Gregory et al., (2007)*	Cross-Sectional data from longitudinal study -	New Zeland	OCD Non-Treatment Seeking (a) and PTSD Non-Treatment Seeking (b)	Adults living in Dunedin, New Zeland.	A cohort of 1,037 children representing 91% of consecutive births between between April 1st 1972 and March 31st 1973 in Dunedin, New Zeland were enrolled in the study. 96% of living cohort members (n=972) took part in follow-up assessments at 32 years old.	Current (12 months)	The Diagnostic Interview Schedule (18–32 years).	***a.Primary OCD Sample*** Prevalence of PTSD: **18%** (3/17) ***b.Primary PTSD Sample*** Prevalence of OCD: 13% (3/23)	-
16	*Verlinden et al., (2015)*	Cross-Sectional	Netherlands	PTSD Treatment Seeking	Children and adolescents aged between 7-18.	392 children were recruited from the department of youth welfare and four child trauma centres in different regions of the Netherlands between June 2008 and March	Current	Anxiety Disorders Interview Schedule the Child and Parent Version (Siebelink & Treffers, 2001;	**Total Sample** (trauma with & without PTSD): 3.6% or 14/392. **Trauma & PTSD: 7.3% or 13/178. Trauma no PTSD:** 0.5% or 1/214.	-

	Author	Design	Country	Study Type	Population	Recruitment and response rate	Time-frame	Measure	Prevalence Rate (Proportion, %)	Odds Ratio/ Relative Risk and other relevant results
						2011. The children had been exposed to various types of traumatic events.		Silverman & Albano, 1996)		
17	*Gallagher and Brown (2015)*	Cross-Sectional	USA	PTSD Treatment Seeking	Adults with PTSD presenting for assessment and treatment .	253 adults presenting to CARD (Brown et al., 2001) for assessment and treatment who received a current (n=138) or lifetime (n=253) diagnosis of PTSD were invited to participate in this assessment study.	Current / Lifetime	Anxiety Disorder Interview Schedule for DSM-IV Lifetime Version (Di Nardo, Brown & Barlow, 1994)	Observed Proportion: Current:0.232 (22%) (N=128) Lifetime:0.237 (24%) (N=253)	Conducted a Baysean analysis of lifetime prevalence using Brown et al.' (2001a) study for priors. Prevalence rate: 0.234 (Credible Interval: 0.127 - 0.294).
18	*Knowles, Sripada, Defever, and Rauch (2019)*	Cross-Sectional	USA	PTSD Treatment Seeking	Veterans with PTSD.	1284 veterans seeking treatment for PTSD at a Veterans Association Health Centre System PTSD Clinical team (2005-2013) were enrolled in the study.	Curremt (not clearly specified)	Mini International Neuropsychiatric Interview (Sheehan et al, 1998)	Reports rates of OCD in those Without PTSD: 3.6% (of 1284), With PTSD: 6% (of 867)	OCD is significantly more prevalent in veterans with PTSD than in those without PTSD (Chi2 (1,N=2151)=6.94, p=0.01).
19	*Gekker et al. (2018)*	Cross-Sectional	Brazil	PTSD Treatment Seeking	Adult patients with a history of exposure to traumatic events and reporting PTSD symptoms attending a specialized PTSD programme from 2004 to 2017.	109 participants were recruited through (1) referrals from mental health professionals (2) radio, television and newspaper interviews given by the researchers or presentations given to professional associations /trade unions (3) social media (4) leaflets and brochures (5) word of mouth. Response rate not reported	Current / Lifetime	Structured Clinical Interviews on DSM-IV axis I diagnoses (SCID-I/P) (First et al., 1996)	Current: 48.6% (out of 109) Lifetime 56.9% (out of 109). Total: 109	--
20	*Nacasch et al. (2011)*	Cross Sectional	Israel	PTSD Treatment Seeking	Adults seeking treatment for	44 patients with combat/terror related PTSD seeing a named	Current	Mini International Neuropsychiatric	41% (N=18/44)	-

	Author	Design	Country	Study Type	Population	Recruitment and response rate	Time-frame	Measure	Prevalence Rate (Proportion, %)	Odds Ratio/ Relative Risk and other relevant results
					combat or terror related PTSD.	psychiatrist within a specialist (secondary referral) psychiatric clinic.		Interview (Sheehan et al, 1998)		
21	*Nemcic Moro et al. (2011)*	Case-Control	Croatia	PTSD Treatment Seeking	Veterans of the 1991-1995 Croatian civil war who developed PTSD during the Croatian civil war.	247 consecutive patients seeking psychiatric treatment were recruited from four different medical centres in Croatia during one month in 2008. 418 patients met inclusion criteria of which 52 refused to participate and 16 were excluded. 354 were included in the research but 61 didn't complete the questionnaires properly and 46 did not meet criteria for PTSD any longer. As a result the final sample was made up of 247 participants.	Does not specify	OCD: Mini International Neuropsychiatric Interview (Sheehan et al, 1998) PTSD: Harvard Trauma Questionnaire	PTSD and DEDNOS sample: 4 out of 59 (6.77%); PTSD group 3 out of 82 (3.65%)	-
22	*Pérez-Benítez, Sibrava, Zlotnick, Weisberg, and Keller (2014)*	Cross Sectional	USA	PTSD Treatment Seeking	American adults meeting diagnostic criteria for PTSD and other disorders (panic, agoraphobia, gad, social phobia). Only the data from Latin American Adults was used.	150 participants recruited through referral from mental health providers, advertisements in the newspapers and on the internet and public transport in the Rhode Island and Massachusetts metropolitan areas between 2004-2011.	Current 'at intake' (not clearly specified)	The Structured Clinical Interview of DSM–IV, Patient Version (SCID-P) (Spitzer, Williams, Gibbon, & First, 1988)	PTSD Meeting criteria for OCD: 1/45 (2.2%)	No significant difference between PTSD and non-PTSD group on rate of OCD – chi 2 test. Non-PTSD group=1.9%
23	*M. Kupchik et al. (2007)*	Cross Sectional	Israel.	PTSD Non-Treatment Seeking	Patients from a community general health regional	60 participants were identified from a community general health	Not clearly specified	The Structural Clinical Interview for Axis I DSM-IV	6.6% (N=2/30).	No significant difference in rate of OCD in those with PTSD and those without (1/30)

	Author	Design	Country	Study Type	Population	Recruitment and response rate	Time-frame	Measure	Prevalence Rate (Proportion, %)	Odds Ratio/ Relative Risk and other relevant results
					outpatient clinic who have had motor vehicle accidents.	outpatient clinic between1993 and 1999.		Disorders—Patient Version (SCID-I/P; First et al., 1995).		
24	*Rodriguez et al. (2004)*	Cross-Sectional	USA	PTSD Non-Treatment Seeking	American adults aged between	539 primary care patients were recruited on day of visit to family medicine practices and university clinics. Those who consented were completed a screening questionnaire. Those who screened positive for an anxiety disorder were invited for interview. 14320 people were approached, 4383 (31%) completed the screening questionnaire of which 2,755 (63%) screened positive for an anxiety disorder. Of these, 1634 took part in the interview (others refused to take part).	Current and lifetime	Structured Clinical Interviews for DSM-IV (First et al., 1996)	Current = 8% (16 out of 199) Lifetime = 11% (22 out of 208)	Relative Risk Reported: Current: 1.03 (NS) Lifetime: 1.36 (NS)

Table 1. Summary of prevalence rates and odds ratios reported in the papers reviewed

ID	Author (Year)	Associated Paper	1	2	3	4	5	6	7	8	9	10	Total	Risk of Bias
1	**Boerema et al. (2019)**	Schuurmans et al. (2012)	No	No	No	Yes	Yes	Yes	No	No	Yes	No	4	High
2	**Fontenelle et al. (2012)**	Miguel et al. (2008)	No	No	Yes	Yes	Yes	Yes	Yes	Yes	U	Yes	7	Low
3	**Brown et al. (2001)**		No	No	No	Yes	Yes	Yes	Yes	No	U	Yes	5	Medium
4	**Williams et al., (2017)**	Williams et al., (2012)	No	No	No	Yes	Yes	Yes	No	Yes	N	Yes	5	Medium
5	**Pinto et al. (2006)**		No	No	No	Yes	Yes	Yes	No	Yes	U	Yes	5	Medium
6	**Lafleur et al. (2011)**		U	U	No	Yes	Yes	Yes	Yes	Yes	U	No	4	Medium
7	**Hasler et al. (2005)**		No	No	No	Yes	No	Yes	Yes	Yes	U	No	4	High
8	**Denys et al., (2004)**		No	No	Yes	Yes	Yes	Yes	No	No	U	Yes	5	Medium
9	**Grabe et al. (2008)**		No	No	No	Yes	No	Yes	Yes	Yes	No	Yes	5	Medium
10	**Gros et al., (2013)**		Yes	No	No	Yes	Yes	Yes	Yes	Yes	N	Yes	7	Low
11	**Ruscio et al. (2010)**	Kessler et al. (2004)	Yes	Yes	No	No	No	Yes	No	No	Yes	Yes	5	High
12	**Grabe et al. (2001)**		Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	7	Low
13	**Essau et al. (2000)**		No	No	No	Yes	Yes	Yes	No	Yes	U	Yes	5	Medium
14	**Kadri et al. (2007)**		Yes	Yes	U	Yes	U	Yes	No	Yes	Yes	Yes	7	Low
15	**Gregory et al., (2007)**		Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	7	Low
16	**Verlinden et al. (2015)**		No	No	No	Yes	Yes	Yes	Yes	Yes	U	Yes	6	Medium
17	**Gallagher and Brown (2015)**		No	No	No	Yes	Yes	Yes	No	No	U	Yes	4	High
18	**Knowles et al. (2019)**		No	No	Yes	Yes	No	Yes	No	No	Yes	No	4	High
19	**Gekker et al. (2018)**		No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7	Low
20	**Nacasch et al. (2011)**		No	No	No	Yes	Yes	Yes	No	Yes	U	Yes	5	Medium
21	**Nemcic Moro et al. (2011)**		No	No	No	Yes	No	Yes	No	No	Yes	No	3	High
22	**Perez-Benítez et al., (2014)**	Weisberg et al., (2012)	No	No	No	Yes	Yes	Yes	No	Yes	U	No	4	High
23	**Kupchik et al. (2007)**		Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	6	Medium
24	**Rodriguez et al. (2004)**		No	No	No	Yes	Yes	Yes	No	No	N	Yes	4	High

Table 2. Quality Assessment of Papers. Polmann et al's. (2019) system is used for rating studies: studies are categorised as high (seven or above), medium (five to six) or low (score of four or below) risk of bias according to their score on the JBC checklist.

Appendices

Appendix 1. Systematic search strategies

2. **PsycInfo (search limited to title, abstract and key word)**

   (Obsessive Compulsive Disorder/ OR compulsi*.ti,ab,id.OR obsessi*.ti,ab,id.OR ocd.ti,ab,id.) AND (Posttraumatic Stress Disorder/ OR Post-Traumatic Stress/ OR post trauma*.ti,ab,id. OR posttrauma*.ti,ab,id. OR post?trauma*.ti,ab,id. OR ptsd ti,ab,id.)

3. **Medline**: **(limit to title, abstract and key word)**

   Obsessive-Compulsive Disorder/ OR obsessi*.ti,ab,kf. OR compulsi*.ti,ab,kf. OR ocd.ti,ab,kf. AND (Stress Disorders, Traumatic/ OR Stress Disorders, Post-Traumatic/ OR Stress Disorders, Traumatic, Acute/ OR ptsd.ti,ab,kf. OR post trauma*.ti,ab,kf. OR posttrauma*.ti,ab,kf. OR post?trauma*.ti,ab,kf. OR ptsd. ti,ab,kf.)

4. **PTSD Pubs (limit to anything other than full text)**

   MAINSUBJECT.EXACT("Obsessive-Compulsive Disorder") OR noft(ocd) OR noft(obsessi*) OR noft(compulsi*)

   ((MAINSUBJECT.EXACT("PTSD (DSM-III-R)") OR MAINSUBJECT.EXACT("PTSD (DSM-III)") OR MAINSUBJECT.EXACT("PTSD (DSM-IV)") OR MAINSUBJECT.EXACT("PTSD (DSM-5)") OR MAINSUBJECT.EXACT("Complex PTSD") OR MAINSUBJECT.EXACT("PTSD (ICD-11)") OR MAINSUBJECT.EXACT("PTSD (ICD-10)") OR MAINSUBJECT.EXACT("PTSD (ICD-9)")) OR noft(posttrauma*) OR noft(post trauma*) OR noft(post?trauma*) OR noft(ptsd)) AND (MAINSUBJECT.EXACT("Obsessive-Compulsive Disorder") OR noft(ocd) OR noft(obsessi*) OR noft(compulsi*))

5. **CINAHL**

MH "Obsessive-Compulsive Disorder" OR “Obsessi* OR Compulsi* AND MH "Stress Disorders, Post-Traumatic" OR “ptsd” OR post?trauma* OR post trauma* OR posttrauma* OR ptsd* = 448 hits

PILOTS

- MAINSUBJECT.EXACT.EXPLODE("Obsessive-Compulsive Disorder") OR noft(ocd) OR noft(obsessi*) OR noft(compulsi*)

Appendix 2. Bespoke screening and selection tool

Review Question: What is the prevalence of co-occurring PTSD and OCD?

Inclusion Criteria (Based on CoCoPop)

- **Condition:** Primary diagnosis of Obsessive-Compulsive Disorder (OCD) or Post Traumatic Stress Disorder (PTSD)
- **Context:** Any
- **Population:** Children or adults with a confirmed diagnosis of OCD or PTSD.
- **Study Design:** Any

Author / Study ID (Year): Date:

Condition

Include:

- Papers recruiting individuals with a primary diagnosis of OCD or PTSD.
- Papers using a validated measure is to confirm the diagnosis.
- DSM IV diagnostic criteria applied

Exclude:

- Papers recruiting individuals with a different primary diagnosis.
- Look at co-morbidity of trauma with OCD, without establishing a diagnosis of PTSD.

- Did not indicate the validity of the diagnostic measure or used the measure in a way which may compromise is validity (for example translating into another language).
- Are recruited to a study because of a different primary diagnosis (e.g. anorexia, bipolar disorder).
- If individuals with PTSD or OCD are recruited, but prevalence rates are not reported.
- If the validated diagnostic tool applied is used in a way which might compromise validity (e.g. translating into another language).

Context

Include:

- Recruiting participants from any setting (e.g. clinical or community).
- Report prevalence of co-occurring PTSD or OCD (even if this is not the primary aim of the study).

Exclude:

- Paper is published during or after 1994 (year of publication of DSM IV)
- Recruit groups of participants with OCD or PTSD without looking at co-morbidity.
- Look at co-morbidity in the context of another diagnosis, unless the co-morbidity in the absence of the other diagnosis is also reported.

Population

Include:

- Individuals presenting with a primary diagnosis of PTSD.
- Individuals recruited with a separate primary diagnosis (e.g. bipolar disorder) for whom rates of PTSD or OCD are measured.

Study Design

Include:

- Quantitative Research

Exclude:

- Qualitative Research (including case studies or case reviews)
- Grey Literature

Journal

Include:

- Peer Reviewed

Exclude:

- Not Peer Reviewed

Appendix 3 – Data Extraction Form Template

1. ID
2. Author
3. Related paper with further information about study methodology / associated publications
4. Full text / Abstract
5. Primary Diagnosis
6. Study Design
7. Country conducted
8. When Conducted (years)
9. Population Recruited
10. Recruitment Method
11. Response Rate
12. Number Recruited
13. Number Included in Analysis
14. Sample Size Calculation Conducted
15. Measure Used
16. Inter rater reliability stat reported
17. Prevalence % reported
    - Current
    - Lifetime
18. Analysis related to Prevalence rate
    - Odds Ratio
    - Relative Risk Ratio
19. Other Relevant Analyses

Appendix 4

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Appendix 5. Journal Guidelines for Authors

Journal of Anxiety Disorders Guidelines for Authors, retrieved from:

https://www.elsevier.com/journals/journal-of-anxiety-disorders/0887-6185/guide-for-authors

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