Childhood maltreatment and social functioning in psychotic disorders: a systematic review protocol

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ABSTRACT

**Background:** Childhood maltreatment (CM) is thought to play a key role in the etiology and course of psychotic disorders (PD). In addition, CM is related to neurobiological and clinical characteristics that can lead to poor social functioning. However, the extent to which CM and social functioning are directly associated in individuals with PD, is unclear. Therefore, we aim to systematically review the literature to provide an estimate on the strength of the association between CM and different domains of social functioning in PD and to summarize potential moderators and mediators of this association.

**Methods and analysis:** To identify relevant studies, we will systematically search the following databases: Pubmed (Medline), PsycINFO, Embase, Web of Science (Core Collection), and Pilots (trauma), manually search reference lists and contact experts in the field. Studies will be included if they investigate and report on the association between CM (exposure) and social functioning (outcome) in adults with PD. Two independent reviewers will screen titles, abstracts and full texts according to eligibility criteria, perform data extraction and assess study quality according to a modified version of the Newcastle–Ottawa Scale.

**Analysis:** Effect estimates will be pooled in a meta-analysis. Heterogeneity and publication bias will be assessed and the effects of potential moderators (genetic factors, type of diagnosis, duration of illness, type of CM and age at the time of CM exposure) will be analyzed using meta-regressions. Candidate moderators and mediators (neurocognition, cognitive schemas, comorbidities, stress sensitivity, attachment) will be also examined qualitatively.

**Ethics and dissemination:** Because this review will make use of already published data, ethical approval will not be sought. This work has the potential to inform ongoing investigations on the association between the exposure to CM in PD and social functioning. PROSPERO registration number CRD42020175244.

ARTICLE HISTORY

Received 7 June 2021
Accepted 9 June 2021

KEYWORDS

child abuse, neglect, social cognitive skills, interpersonal relationships, community functioning, psychosis, systematic review

PALABRAS CLAVE

abuso infantil, negligencia, cognición social, relaciones interpersonales, funcionamiento en la comunidad, psicosis, revisión sistemática

**HIGHLIGHTS**

- The first systematic review (and meta-analysis) of the association between CM and different domains of social functioning in individuals with PD.
- Evidence on both moderators and mediators of the association is summarized.

Maltrato infantil y funcionamiento social en trastornos psicóticos: protocolo de revisión sistemática

**Introducción:** Se cree que el maltrato infantil (MI) juega un papel clave en la etiología y el pronóstico de los trastornos psicóticos (TP). Además, el MI está relacionado con ciertas características neurobiológicas y clínicas que pueden conducir a un deterioro en el funcionamiento social. Sin embargo, no está claro hasta qué punto el MI y el funcionamiento social están directamente relacionados en los individuos con TP. Por lo tanto, nuestro objetivo es revisar sistemáticamente la literatura para proporcionar una estimación del efecto de la asociación entre el MI y diferentes dominios del funcionamiento social en los TP y resumir los posibles moderadores y mediadores de esta asociación.

**Método y análisis:** Para identificar los estudios relevantes, buscaríamos sistemáticamente en las siguientes bases de datos: Pubmed (Medline), PsycINFO, Embase, Web of Science (Core Collection) y Pilots (trauma), también buscaríamos manualmente en las referencias y contactaremos a los expertos en este campo. Los estudios se incluirán si investigan e informan sobre la asociación entre el MI (exposición) y el funcionamiento social (resultado) en adultos con TP. Dos revisores independientes examinarán los títulos, resúmenes y textos completos de acuerdo con los criterios de elegibilidad, realizarán la extracción de datos y evaluarán la calidad del estudio de acuerdo con una versión modificada de la escala de...
1. Introduction

Childhood maltreatment (CM), that is sexual, physical, or emotional abuse and neglect, is one of the most serious risk factors for the development of physical or mental illness (Gilbert et al., 2009; Hughes et al., 2017). Worldwide, 3 in 4 children – or 300 million children – aged 2–4 years regularly suffer physical and/or emotional abuse by parents and caregivers. In turn, 1 in 5 women and 1 in 13 men report having been sexually abused as a child aged 0–17 years old (WHO, 2021). CM is frequently reported to be more prevalent in individuals with mental disorders, with rates as high as 85% in schizophrenia spectrum disorders, and 77% in affective disorders including major depressive disorder and bipolar disorder (Larsson et al., 2013).

CM plays a particularly important role in the etiology and course of psychotic disorders (PD) (Kelleher et al., 2014, 2015; Trauelsen et al., 2016; Varese et al., 2012). Furthermore, CM has been linked to neurobiological and clinical characteristics that may lead to difficulties of individuals with PD to engage with and navigate the social world (Whitton & Lewandowski, 2008), as manifested in various aspects of their everyday life as independent living, interpersonal relationships and occupational functioning (Couture, Penn, & Roberts, 2006; Green et al., 2008). This is of particular relevance, given that: 1. social functioning is closely related to both mental and physical well-being (Leigh-Hunt et al., 2017; Wang, Mann, Lloyd-Evans, Ma, & Johnson, 2018), 2. satisfying social relationships may protect from adverse stress consequences involving traumatic events (Thornberry & Henry, 2013) and may determine resilience factor for mental disorders (Gan et al., 2021; Holz, Tost, & Meyer-Lindenberg, 2020; Lund et al., 2018; Stain et al., 2012), and 3. a lack of social (including workplace) integration not only affects an individual’s personal well-being but is also important from an economic perspective. In times of both personal and societal crises, including the current COVID-19 pandemic, it seems especially important to strengthen the relational well-being of vulnerable (patient) groups affected by CM (Fares-Otero, Pfaltz, Estrada-Lorenzo, & Rodriguez-Jimenez, 2020; Fares-Otero, Trautmann, Pfaltz, & Rodriguez-Jimenez, 2021).

About two-thirds of patients with PD are unable to fulfil basic social roles as spouse, parent or worker. These social problems remain remarkably stable in the years after the first hospitalization for psychosis (Velthorst et al., 2017), also when psychotic symptoms are in remission (Bellack et al., 2007). In fact, differential effects of CM on clinical outcome may not be apparent at PD onset, but only become evident through poor symptomatic remission and general functioning over time (Prueessner et al., 2021).

CM may impact on later expression of PD by increasing stress sensitivity to later adversity (Lardinois, Lataster, Mengelers, Van Os, & Myin-Germeys, 2011; Lataster, Myin-Germeys, Lieb, Wittchen, & Van Os, 2012). CM constitutes a chronic stressor that affects the regular functioning and development of brain areas (Alemany et al., 2011; Ruby et al., 2014; Ruby, Rothman, Corcoran, Goetz, & Malaspina, 2017) and the regulation of the Hypothalamic–Pituitary–Adrenal axis, involved in
the response to stress (Teicher & Khan, 2019; Teicher, Samson, Anderson, & Ohashi, 2016). These brain alterations may lead to impaired emotional regulation (Cancel et al., 2017) and poor social functioning in individuals with PD (Couture et al., 2006; Green et al., 2008; Wang et al., 2018; Whitton & Lewandowski, 2008). Furthermore, it has been recently proposed that individuals exposed to CM show abnormal neural responses to social signals, such as facial expressions (McCrorry et al., 2013). In turn, CM has been linked to alterations in the perception and interpretation of emotional (Passardi et al., 2018) and neutral facial expressions (Pfaltz et al., 2019) in individuals with PD (Rokita et al., 2020). Moreover, CM contributes to the occurrence of more negative symptoms and suicide attempts (Kim, Kaspar, Noh, & Nam, 2006; Ramsay, Flanagan, Gantt, Broussard, & Compton, 2011; Roy, 2005), and poorer response to treatment in patients with PD (Gil et al., 2009; Lysaker, Beattie, Strasburger, & Davis, 2005; Lysaker, Outcalt, & Ringer, 2010; Read, Van Os, Morrison, & Ross, 2005; Thomas, Höfler, Schäfer, & Trautmann, 2019) (compared to those without CM). CM is further associated with the severity, persistence, and content of hallucinations and delusions (Bailey et al., 2018; Trotta, Murray, & Fisher, 2015) – symptoms which all might be related to diminished social involvement in patients with PD.

Some factors are thought to moderate the impact of CM on social functioning. These include genetic (vulnerability) factors (Mas et al., 2020), type of diagnoses (non-affective vs. affective psychoses), duration of illness (early vs. chronic psychosis), type of CM (deprivation vs. threat) (McLaughlin, Sheridan, & Lambert, 2014; Sheridan, Shi, Miller, Salhi, & McLaughlin, 2020) and the age at time to CM exposure (early vs. late) (Alameda et al., 2015; Alameda et al., 2016) in individuals with PD.

In addition, knowledge on possible mediators lying on proposed causal path between CM and impairments in social functioning could help to understand the mechanisms underlying this association in PD to design interventions that might be more effective for patients with CM. According to previous research, such mediators might include neurocognitive functions (Rodriguez et al., 2021), negative cognitive schemas (beliefs and concepts about self and others), symptoms of posttraumatic disorders, affective dysfunction and dysregulation (anxiety and depressive symptoms) (Palmier-Claus et al., 2016), stress sensitivity (Lardinois et al., 2011; Lataster et al., 2012), and (insecure) attachment style (Alameda et al., 2020; Sidel et al., 2020; Williams, Bucci, Berry, & Varese, 2018).

However, there is, to date, no systematic review on the relationship between CM and social functioning (providing information on the strength of the relationship) in PD which considers moderators and mediators of this relationship. Such a review could improve our understanding of pathways through which CM influences later social functioning and might provide targets to develop effective (preventive) interventions for PD patients with CM.

Therefore, the first aim of our systematic review (and meta-analysis) is to provide an estimate on the strength of the relationship between CM and social functioning in patients with PD. The second aim of our systematic review is to investigate moderators and mediators of the relationship between CM and social functioning in adults with PD.

2. Materials and analysis

This protocol follows the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) reporting guidelines for systematic review and meta-analysis protocols (see supplementary file 1) (Shamseer et al., 2015). The final review will also follow PRISMA reporting guidelines, and will include a PRISMA checklist and flow diagram (Moher, Liberati, Tetzlaff, & Altman, 2009). This study has been registered in the International Prospective Registry of Systematic Reviews (PROSPERO CRD420201 75244).

2.1. Inclusion of studies

Inclusion and exclusion criteria are summarized in Table 1. Because of the relationship under study, we are interested in adults with PD with and without a history of CM. The condition or domain being studied involves the PD spectrum, including non-affective PD (schizophrenia, schizophreniform disorder) and affective disorders (bipolar disorder, major depression) with psychotic features.

CM will be defined as a standardized measure according to the definition of CM (Teicher & Samson, 2013), that is, physical, emotional or sexual abuse and physical or emotional neglect, including (witnessing) domestic violence and bullying exposure occurring before age 18.

We anticipate that studies will use various measures of social functioning, including but not limited to occupational functioning and interpersonal relationships, and standardized social cognitive functioning assessment scores. Studies will not be included if they do not measure at least one aspect of social functioning using standardized measures, instead relying on an unclear source or self-reported outcomes.

Studies will be included if they are original research, are published in English, German or Spanish and in a peer-reviewed journal. The search will be restricted to publications years 1990–2021. Only quantitative, cross-sectional and longitudinal studies will be included. In the case of longitudinal studies, this can aid the inference of the direction of the association,
particularly where included studies adjust for potential common causes of CM and social functioning such as parental mental health (Matheson et al., 2017; Verdolini et al., 2021), stressful life events and environmental conditions (Uher & Zwicker, 2017) including, for example, substance abuse (Setién-Suero et al., 2020), low socioeconomic status (McLaughlin et al., 2011) or high urbanicity (Misiak et al., 2017).

Studies which aim to conduct or evaluate an intervention during the observed study period will be excluded to ensure that any observed association is not confounded with the intervention. Reviews, meta-analyses, editorials, opinion pieces, letters to the editor, commentaries, retrospective studies, case reports, clinical vignettes, books, chapters, theses, dissertations, conference proceedings, randomized controlled trials of pharmacological or psychological interventions and exclusively qualitative studies will be excluded. Grey literature will be excluded, leading to less heterogeneity in study quality. Animal models will also be excluded.

Corresponding authors will be contacted for full texts and information necessary of our planned analyses that cannot be obtained publicly or via institutional access.

2.2. Information sources

Studies will be identified by searching the following electronic databases:
- Embase (via Ovid).
- PsycInfo (via Ovid)
- PubMed Medline (via NCBI).
- Web of Science (Core Collection)
- Pilots

We will also search reference lists of included studies and relevant existing reviews (backward citation searching), and papers which have referenced them (forward citation searching). Backward and forward citation searching will be carried out in Web of Science Core Collection. If a citation cannot be identified in the Web of Science, Google Scholar will be used. Finally, experts in the field and corresponding authors of included studies will be contacted with a link to the PROSPERO record detailing eligibility criteria to identify any additional studies.

2.3. Search strategy for electronic databases

Electronic database searching will be conducted using a combination of key words (using truncation as needed) and MeSH terms (Medical Subject Headings) exploded to include narrower terms and the combination of key blocks or key-terms. The exact search terms used will, therefore, be adapted according to database thesauruses, but broadly will be grouped according to three concepts: 1. Childhood maltreatment (e.g. child abuse, neglect); 2. Social functioning (e.g. occupational functioning, interpersonal relationships, social cognition); 3. Psychotic disorder (e.g. schizophrenia, psychosis).

The full search strategy for PubMed (MEDLINE) will be as follows: ‘social functioning’ OR ‘Social Adjustment’ [MeSH] OR ‘Social Behavior’ [MeSH] OR ‘Social skills’ [MeSH] OR ‘Interpersonal Relations’ [MeSH] OR ‘social networks’ OR ‘occupational functioning’ OR employment OR ‘community functioning’ OR ‘social cognition’ OR ‘attribitional style’ OR ‘emotion recognition’ OR ‘self- regulation’ OR ‘theory of mind’ OR ‘face perception’ OR ‘face discrimination’ OR ‘social perception’ OR ‘emotion regulation’ OR ‘emotion perception’ OR ‘social inference’) AND (‘child* abuse’ OR ‘child* neglect’ OR ‘child* physical abuse’ OR ‘child* sexual abuse’ OR ‘child* emotional abuse’ OR ‘childhood trauma’ OR ‘child* maltreatment’ OR ‘early life adversity’ OR ‘domestic violence’ OR ‘bullying OR CTQ OR CECA) AND (psychosis OR schizophrenia OR schizoaffective OR schizophreniform OR psychotic OR major depression OR bipolar disorder).

Table 1. PECOS criteria for inclusion and exclusion studies.

| Parameter | Inclusion criteria | Exclusion criteria |
|-----------|--------------------|-------------------|
| Population Exposure | Adults over age 18 with psychotic disorder defined in the DSM-III, DSM-III-R, DSM-IV, DSM-IV-TR, DSM-5, ICD-10. CM (emotional, physical, sexual abuse or emotional, physical neglect, domestic violence, bullying exposure before age 18) as measured using standardized measures to determine examined cross-sectional relationship between CM variable and social functioning variable. Reported relationship between baseline CM variable and social functioning in PD. | Children or adolescents under age 18. Organic psychosis. |
| Comparison Outcome | Social functioning involving occupational and vocational functioning, social cognitive skills, social relationships, as measured using standardized measures. | Aim to conduct or evaluate an intervention during the observed study period. Reviews, meta-analyses, retrospective studies, case reports, clinical vignettes, randomized controlled trials and exclusively qualitative studies. Grey literature. Animal studies. |
| Study design | Quantitative longitudinal studies (with prospective data collection). Original research published in a peer-reviewed journal. Published in English, German or Spanish. Full text available including data on the association between CM and social functioning in PD. |  |
2.4. Data management

All identified citations will be downloaded and managed using the software Zotero and duplicates will be removed. Article screening and data extraction will be tracked using Microsoft Excel.

2.5. Selection process

Following electronic database searching, initial title and abstract screening will be carried out by two independent reviewers. The reviewers will initially screen the titles and abstracts according to the prespecified eligibility criteria (see Table 1). All references will be screened by both reviewers to ascertain the level of agreement. Articles which appear eligible from the abstract, or are of unclear eligibility, will be full text screened. This will also be carried out by two independent reviewers. The process of independent abstract and full-text screening will be repeated for references identified during backward and forward citation searching following an initial screen carried out by the lead researcher. Any disagreements over study eligibility will be discussed, and a third reviewer will be consulted if a consensus cannot be reached.

2.6. Data extraction

Data will be extracted using a data extraction form which will be inform by the full-text screening and will be piloted on the included studies before being finalized. The anticipated data extraction form is presented as supplementary file 2. Data extraction will also be carried out by two reviewers. Any disagreements over data extraction will be discussed, and a third reviewer will be consulted if a consensus cannot be reached. If multiple studies use the same data sources, they will still be recorded separately if they contain different information (e.g. regarding covariates, moderators and mediators).

2.7. Quality assessment

The included studies will be assessed for study quality using a modified version of the Newcastle–Ottawa Scale (NOS) (Wells et al., 2008) for non-randomized studies, including case-control and cohort studies (i.e. cross-sectional and longitudinal studies), recommended by the Cochrane Handbook (section 13.5.2.3) (Higgins & Green, 2011). Study quality will be assessed by two independent reviewers. Risk of bias assessment will be conducted on the included studies and agreement will be checked. Disagreements will be discussed, and a third reviewer will be consulted if a consensus cannot be reached. Results from study quality assessment will be taken into consideration when interpreting the strength of evidence for the reported associations and will also be considered in the quantitative analyses (see the Data synthesis section).

2.8. Data synthesis

The characteristics and findings of included studies will be presented in a data extraction table and will be discussed in a narrative synthesis. If we identify multiple studies investigating similar exposure and outcome variables, a random-effects meta-analysis will be conducted (Lakens, 2013). If more than one effect size for the same effect is reported from the same sample, the mean of these associations will be taken and used in meta-analysis.

Summary estimates for the effect of CM on later social functioning will be pooled. The effect size for social functioning will be reported using the standardized mean difference when different studies use different instruments. Heterogeneity of effect estimates will be investigated using the $I^2$ statistic. Publication bias will be assessed using Funnel-Plot and Egger’s test numerically for publication bias if at least 10 studies are included in the meta-analysis (Cochrane Handbook section 10.4.3.1) (Higgins & Green, 2011).

To investigate moderators in the association between CM and social functioning in PD, meta-regressions will be carried out. Potential moderators might include type of diagnoses and duration of illness, type and age at time of CM exposure. In addition, the impact of study quality will be investigated. Other investigations of potentially important moderators may be informed post hoc by the included studies but will be identified as such in the final report as recommended in the Cochrane Handbook (section 9.6.5.2) (Higgins & Green, 2011). Estimates of the meta-regressions will be based on the restricted maximum likelihood method. Standard errors and confidence intervals will be calculated as suggested by Knapp & Hartung, because this procedure leads to more appropriate false-positive rates than the standard approach (Knapp & Hartung, 2003). $P$-values are calculated using a permutation test approach based on Monte Carlo simulation (2000 permutations) which results in more accurate $p$-values compared to standard methods, particularly if the number of studies in a model is small (Higgins & Thompson, 2004).

Finally, if multiple studies investigate similar mediator variables for example, with respect to neurocognitive functions, cognitive schemas (self-esteem, beliefs), posttraumatic symptoms and disorders (dissociation), affective dysfunction (anxiety, depression) and dysregulation, stress sensitivity, and attachment, meta-analytical structural equation modelling will be employed to synthesize indirect (mediation) effects.

The analyses of publication bias, heterogeneity, calculation of random and fixed effects for association estimates, and meta-regression for moderator’s
analysis between CM and social functioning will be performed using the METAN package from Stata software.

2.9. Study status

Initial electronic database searching was conducted in March 2020. The search will be updated prior to completion, with the review expected to be completed in December 2021.

2.10. Ethics and dissemination

As this review will make use of already published data, ethical approval will not be sought. On completion, the review will be submitted to a peer-reviewed journal in the field of mental health research for publication. Findings will also be presented at practitioner-facing conferences. The findings will inform upcoming work on the association between CM and social functioning in PD.

2.11. Patient and public involvement

This review has been planned to further the development of interventions and provide an evidence-based rationale for selecting and applying tailored (psychosocial) interventions to patients with PD and a history of CM.

3. Discussion

Here, we present a study protocol for conducting a systematic review and meta-analysis to provide a summary of the current literature and to examine the magnitude of the relationship between CM and social functioning in individuals with PD, with the additional aim of investigating mediators and moderators of this association.

Several studies demonstrate a high prevalence of maladjustment and social problems in individuals with PD and a history of CM (Hjelseng et al., 2020; Stain et al., 2014). Ongoing plans to develop psychosocial interventions in mental health settings further demonstrate increasing recognition that social functioning and well-being are closely linked to adverse experiences in childhood in patients with PD (Turner et al., 2019). This underlines the importance of summarizing the current literature on the relationship between CM and PD with regard to social functioning. However, no study has yet quantitatively summarized the literature on the relationship between CM and social functioning (involving several social domains) in the PD spectrum (Rokita, Dauvermann, & Donohoe, 2018; Vila-Badia et al., 2021), including potential mechanisms and moderating factors.

An evidence-based model of potential pathways on the relationship between CM and social functioning in PD could be used to develop novel intervention and clinical guidelines, aiming at improving social functioning and integration of individuals with PD. Lately, the research about PD and CM has generated wide interest in researchers. Nevertheless, most of the currently available reviews and meta-analysis have focused on the study of the relationship between cognitive and symptoms dimensions of PD and CM (Alameda et al., 2021; Rokita et al., 2018), regardless of social, work or community life domains. It is our hope that we can contribute to close this gap.

If we confirm the finding of an association between CM and poor social functioning, a better recognition of the special needs and the design of specific interventions that might be more effective for patients with PD would be needed. First, it might be very important to systematically assess different CM (types) experiences in routine care (which is barely done so far) as standard practice in (mental) health settings. Second, social functioning should be monitored closely in these patients. Our findings may call for the development of new strategies to assess different levels of social dimensions, such as social cognition skills and social determinant of (mental) health factors (Santamaria-García et al., 2020). And third, these patients might need special treatments that specifically target social functioning, that is, on interpersonal difficulties and/or dismissed employment (Sansone, Leung, & Wiederman, 2012).

If a moderating role of genetic factors was confirmed between CM and social functioning in PD, findings would emphasize the gene × environment perspective about PD and would advocate for trauma-informed approaches and psychosocial therapy-based interventions (Gianfrancesco, Bubb, & Quinn, 2019). Although the evidence base has grown on the safe use of trauma-focused psychological interventions in reducing posttraumatic symptoms in individuals with PD, yet results are mixed with regard to secondary effects on additional domains (Adams, Ohlsen, & Wood, 2020; Swan, Keen, Reynolds, & Onwumere, 2017). Our review would give further information about trauma-related treatments (de Bont, van Minnen, & de Jongh, 2013; Van Den Berg et al., 2018; van Minnen et al., 2016), including social recovery therapy (Albert, Uddin, & Nordentoft, 2018; Fowler, Hodgetkins, & French, 2019), that represent promising but controversial approaches (yet no evidence found in youth at risk of psychosis) (Devoe, Farris, Townes, & Addington, 2019) to improve social functioning.

Our results on the mediating role of neurocognitive functions between CM and social functioning could also suggest focusing on certain abilities in neuropsychological rehabilitation plans to be integrated in
comprehensive models of social outcome in people with PD (better perhaps in early stages of the illness). Literature suggests that deficits in neurocognition precede those in social cognition, and that these domains are particularly deleterious for functioning in PD (Rodriguez et al., 2021). However, no evidence has demonstrated that deficits in neurocognition may mediate the links between CM and social functioning in PD, so this needs to be further explored as research is still scarce. Based on our results, education programmes and supported employment could target certain (neuro)cognitive deficits to help these individuals to return to school or acquire a job given their strong predictive value on occupational outcome (Pothier et al., 2019).

Moreover, if a mediating role of stress sensitivity is confirmed in the association between CM and social functioning in PD, this would mean that we support the biopsychosocial approach and give further information on socio-cognitive and socio-affective trainings targeting (acute) psychosocial stress related (heightened) responses (Engert, Grant, & Strauss, 2020; Engert, Kok, Papassotiriou, Chrousos, & Singer, 2017), to help patients cope with stress in their life that may be preventing them from achieving or maintaining recovery (Gianfrancesco et al., 2019). Furthermore, if post-traumatic symptoms and other comorbid mood disorders would mediate the association between CM and social functioning, our findings would guide cognitive-behavioural therapies (in adapted formats) for individuals with PD and CM (Fares-Otero et al., 2021), may including breathing retraining, education, and cognitive restructuring (Mueser et al., 2015).

People with PD are among the most disadvantaged in society, and many experience social and economic hardship. Yet, further research is required to understand the active ingredients of interventions to maximize the effectiveness in reducing public stigma towards people with PD (Morgan, Reavley, Ross, Too, & Jorm, 2018). If cognitive schemas (negative beliefs about self and others) mediate the relationship between CM and social functioning, our findings could give further information on design interventions to reduce social anxiety, and to increase social contact and empathy in these patients, may also involving psychoeducational programmes with family members.

Furthermore, our results would emphasize that social embedding and social support are critical for mental health protection and that well-being during real-life social contact is linked to social resilience in individuals PD with CM (Gan et al., 2021). Given that sequelae of CM may affect the ability to engage in both attachment and therapeutic relationships (Picken, Berry, Tarrier, & Barrowclough, 2010), our review on the association between CM and social functioning in PD is therefore a major concern for therapy delivery (MaBeth, Gumley, Schwannauer, & Fisher, 2011).

This systematic review inevitably will have some limitations. CM will include studies which obtain CM data from retrospective self-reports, yet in a previous study on a representative cohort, CM was associated with poorer functional outcomes regardless of whether this was reported only prospectively, only retrospectively, or both (Latham et al., 2021). Our restriction to cross-sectional and longitudinal studies may also result in some relevant data being missed (e.g. from the control groups of randomized controlled trials), nonetheless, this is considered an important inclusion criteria as longitudinal designs are well suited for investigating the relationships under study and can aid information about directions and developmental trajectories (Anstey & Hofer, 2004). In our review, we will exclude studies which do not obtain social functioning data from standardized measures to ensure the objectivity of our outcome measure. Finally, the exclusion of grey literature (that leads to less heterogeneity in study quality) may cause relevant findings to be missed.

Overall, to our knowledge, this will be the first systematic review (and meta-analysis) that studies the association between CM and several social domains in PD, integrating moderators and mediators of this relationship into one document. This work is timely and of great public interest. The results of this systematic review will serve as a basis for directing future research on the treatment of PD and CM survivors.

Acknowledgments

With thanks to Dr. Jose-Manuel Estrada-Lorenzo, Health Library, University Hospital 12 de Octubre, for providing help on early stages of the literature search, and Dr. David Lora Pablos, Research and Clinical Epidemiology Unit, University Hospital 12 de Octubre, for providing methodological comments on the study protocol. The first author is supported by the Madrid Regional Government (R&D activities in Biomedicine, grant number S2017/BMD-3740 - AGES-CM 2-CM) and Structural Funds of the European Union.

CRediT author statement

NEFO: Conceptualization, Investigation, Methodology, Writing Original Draft, Writing-Review & Editing, Funding acquisition; MCP: Writing-Review & Editing; RRJ: Review & Editing; IS: Writing-Review & Editing; ST: Conceptualization, Methodology, Writing-Review & Editing, Supervision. All authors approved the final version of the submitted manuscript.

Data sharing

Data sharing is not applicable to this article as no new data were created or analyzed in this study.
Disclosure statement

Dr. R. Rodriguez-Jimenez has been a consultant for, spoken in activities of, or received grants from: Institute of Health Carlos III, Sanitary Research Fund (FIS), Biomedical Research Networking Centre in Mental Health (CIBERSAM), Madrid Regional Government (S2010/BMD-2422 AGES; S2017/BMD-3740), Janssen Cilag, Lundbeck, Otsuka, Pfizer, Ferrer, Juste, Takeda, Exelixis, Angelini, and Casen-Recordati.

Ethics approval

This review will make use of already published data; therefore, ethical approval will not be sought.

Funding

This study was supported in part by a research grant provided by the German Academic Exchange Agency DAAD: Deutscher Akademischer Austauschdienst [number 91629413] to the first author.

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