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Association between functional social support and cognitive function in middle-aged and older adults: a protocol for a systematic review

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ABSTRACT

Introduction Maintenance of cognitive function into old age is important for ageing populations. Researchers seek to identify modifiable risk and protective factors for cognitive function. One such modifiable factor is functional social support, that is, one's perception of whether their social network can provide resources such as material help, companionship, information and emotional contact, if needed. While the literature generally reports positive associations between functional social support and cognitive function, results vary according to study methods such as the tool used to measure functional social support or the specific cognitive domain under investigation. Our review will summarise the association between functional social support and cognitive function in middle-aged and older-aged adults who reside in any setting (eg, community dwelling, long-term care facilities). We will also identify sources of discrepant findings between studies.

Methods and analysis This protocol was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols guideline. PubMed, PsycINFO, Sociological Abstracts, Cumulative Index of Nursing and Allied Health Literature (CINAHL) and Scopus will be searched from inception to the present using a search strategy developed with a medical librarian's help. We will supplement the database searches with a grey literature search. English-language or French-language studies with a comparison group will be subject to inclusion, regardless of the measures used to assess functional social support or cognitive function. We will assess risk of bias with the Cochrane Risk of Bias Tool-Version 2 or the Newcastle-Ottawa Scale, narratively synthesise the extracted data and conduct a meta-analysis of studies with similar characteristics (eg, sample age and sex, cognitive function outcomes). Two independent raters will screen articles and assess risk of bias.

Ethics and dissemination This review is timely given the push toward early diagnosis and treatment of dementia/major neurocognitive disorder and other types of cognitive impairment. This protocol does not require a formal ethics review. We will publish our findings in a peer-reviewed journal.

Strengths and limitations of this study

- Our systematic review and meta-analysis will be the first review to focus exclusively on the association between functional social support (overall and subtypes) and cognitive domains (eg, memory, executive function) or diagnostic states (eg, mild cognitive impairment/mild neurocognitive disorder, dementia/major neurocognitive disorder).
- This protocol adheres to the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols guideline.
- We will search the grey literature in addition to PubMed, PsycINFO, Sociological Abstracts, CINAHL and Scopus, and include articles published in English or French.
- Two independent reviewers will screen retrieved citations, extract data and assess risk of bias.
- Meta-analysis could be challenging because of potential heterogeneity in methods for measuring social support and cognition.

INTRODUCTION

Preserving cognitive health and helping people maintain functional independence has become an increasing priority for individuals and care providers as populations age. Lower scores on measures of cognitive function are associated with increased frailty[1] and limitations to activities of daily living.[2] Uncovering potentially modifiable risk or protective factors for cognitive decline is key to preventing or managing clinical outcomes such as dementia/major neurocognitive disorder or mild cognitive impairment/mild neurocognitive disorder, and for managing normal, age-related declines incognition.

Several reviews have investigated the association between one such modifiable factor, social support and the preservation of cognitive function.[3–7] However, the concept of social support is multifaceted and definitions

have varied considerably across studies, making conclusions from this literature difficult.

Broadly, measures of social support assess either structural or functional features of support, which are overlapping but distinct processes.[8] Structural social support refers to the presence and objective quantity of potential support sources one may access,[8] with common measures of this construct including marital status, size of social network (eg, number of relatives or friends) and amount of social activity or community involvement.

Functional social support, in contrast, assesses whether the perceived availability of social resources such as the people in one's social network fulfil certain functions in times of need (eg, provide emotional support when sad, provide transportation to medical appointments). Functional social support has been hypothesised to positively impact physical and psychological health by buffering the effects of stressful events and by increasing positive psychological factors such as self-worth; however, the exact pathways are not known.[9] Several distinct subtypes of functional support have been identified, including emotional, informational, tangible and affection support, as well as positive social interactions.[8]

The association between structural support and cognitive function has been investigated more frequently[10–19] than that of functional support, but there is growing evidence for the importance of functional support[20–27] which may more accurately assess the level and perceived value of support available to an individual.

Previous reviews have demonstrated a relationship between structural social support and cognitive function[3 7] and dementia/major neurocognitive disorder.[4] However, fewer reviews have investigated the impact of functional social support on cognition[3 5] and, to our knowledge, only the review by Kelly *et al* on the impact of social activities, social networks, social support and social relationships on cognitive function in healthy older adults has included discussion of functional social support subtypes.[5] They found variation in the association between cognitive function and subtypes of functional social support, with emotional support demonstrating stronger associations than instrumental or informational support. However, the number of included articles on functional social support was limited (n=9), prohibiting the authors from thoroughly assessing the associations between each functional subtype and cognitive function (eg, only one study included the subtype of positive social interactions).

In the 3 years since Kelly *et al*'s literature search ended (January 2017),[5] primary studies have reported inverse associations between high levels of certain subtypes of functional social support and cognitive function.[27 28] In contrast, other studies have found positive associations between functional support subtypes and cognitive function.[23 24] Therefore, the time is ripe for an updated systematic review and meta-analysis to better understand the association of functional social support and its subtypes with cognitive function. This is especially timely in light of the push towards early diagnosis and management of dementia/major neurocognitive disorder, an approach that is predicated on the existence of adequate functional social supports.[29]

This review will build on the foundational work of previous reviews in three ways. First, we will focus specifically on the association between (1) functional social support and its subtypes and (2) cognitive function, thereby allowing us to assess one aspect of social relationships in depth while concomitantly investigating a variety of cognitive outcomes in different populations. Second, by including any study design with a comparison group, we will address the exclusion of articles from previous reviews, which were limited to longitudinal studies.[3–5] Third, we will employ broad search terms and review the grey literature to potentially generate a large number of included studies and identify results that previous reviews could not.

Objectives

The proposed review and meta-analysis will investigate whether functional social support is associated with cognitive domains (eg, memory, executive function) and states (eg, mild or major neurocognitive disorder), and whether this association differs across functional social support subtypes. Where possible, we will conduct subgroup analyses by men and women, community versus institutional residence and length of follow-up.

METHODS AND ANALYSIS

Protocol and registration

We followed Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) guidelines to report this protocol and included the checklist as online supplementary file 1. The completed review will be reported in accordance with the PRISMA guidelines.[30–32]

Study eligibility criteria

Participants

All studies with human participants in mid-to late-life (age 40 years or over) will be considered for inclusion. This wide age range will maximise our ability to observe differing associations across the age spectrum and over time. We will also include studies regardless of participants' residential setting (eg, community dwelling, long-term care facilities).

Study design

We will include all primary studies containing a comparison group (eg, cross-sectional, cohort and case-control study designs, and randomised controlled trials). We will exclude abstracts, editorials, narrative reviews, systematic reviews/meta-analyses, protocols and letters to the editor.

Outcome

We will include articles reporting cognitive function globally, by domain (eg, memory, executive function), by test (eg, Rey Auditory Verbal Learning Test,[33] Animal Fluency

Test[34]) or by diagnosis of cognitive states (eg, mild or major neurocognitive disorder).

Exposure

All measures of functional social support which assess perceived availability of social support will be included in the review. These measures may include validated tools such as the Medical Outcomes Study—Social Support Survey.[35] We will also include articles whose authors purport to study functional social support using other possible measures matching the definition of the construct. We will investigate functional social support as an overall concept and by subtype. Gradients of functional social support will be used as comparators (eg, high vs low support, medium vs low support, change in continuous social support scale scores).

Search strategy

The following electronic databases will be searched from inception (the earliest date for which citations are indexed in the database in question) to January 2020, with monthly updates undertaken prior to final analysis: PubMed, PsycINFO, Sociological Abstracts, CINAHL and Scopus. Grey literature databases (eg, Google Scholar) will also be searched to retrieve unpublished studies, government or stakeholder reports, and conference papers. Results will be limited to English-language or French-language publications. No limitations will be set on geographical location of studies or publication dates. A medical librarian assisted in the development of the syntax for the PubMed search (online supplementary file 2). The syntax will be adjusted accordingly for use with the other databases.

Study selection

The citations retrieved in the literature search will be screened independently by two raters, who will evaluate each citation against questions based on the eligibility criteria: article includes a comparison group, cognitive function outcome, functional social support exposure and adults aged 40 years or over. Initial screening will be undertaken at the title and abstract level, and articles generating a mix of 'yes' or 'uncertain' responses to the eligibility questions will be promoted to full-text screening. Articles will be included in the review if they garner yes responses to each eligibility question at the full-text screening level. Raters will resolve disagreements by consensus, and a third rater will arbitrate in the event consensus is unreachable.

Data extraction

Two raters will independently extract data from the final set of included articles into an Excel (Microsoft Corp., Redmond, Washington, USA) table. Raters will resolve disagreements by consensus, and a third rater will arbitrate when consensus is unreachable. The table will include first author, year of publication, country of data collection, proportion female, setting, length of follow-up, type and measure of social support, type and measure of cognitive function, and quantitative results (eg, mean or median scores on instruments measuring functional social support or cognitive function, number or proportion of participants whose scores exceeded some cut-off value on an instrument in question, ORs, relative risks).

Data management

We will use Covidence (Veritas Health Innovation, Melbourne, Australia) to manage both levels of screening and to record the reasons for excluding citations at either level.

Data synthesis

Based on previous research looking at the association between functional social support and cognitive function,[27] we will narratively synthesise the extracted data in groupings based on functional social support subtypes, gender, setting (ie, community dwelling vs institutionalised populations), study design (eg, longitudinal vs cross-sectional studies) and risk of bias level (low, unclear, high).

We will conduct a meta-analysis if we find a pool of included articles with similar characteristics based on the information in the data extraction table (eg, sample age and sex, functional social support measures, cognitive function domains, lengths of follow-up, etc). We will undertake a series of stratified meta-analyses based on the groupings described in the previous paragraph, if numbers permit.

We anticipate that most included articles will measure cognitive function with scores on neuropsychological tests. Therefore, we will convert between-group differences in endpoint test scores into standard mean differences (Hedges's g) and employ the inverse variance method, DerSimonian-Laird estimator for π^2, and a random effects model to conduct any meta-analyses. In some instances, included articles might measure outcomes dichotomously as clinical diagnoses (eg, mild neurocognitive disorder—yes/no). If so, then we will transform the log ORs into standard mean differences using Borenstein *et al*'s formulas.[36] Statistical heterogeneity will be tested with the χ^2 test and I^2 statistic, with $p>0.10$ and $I^2>50\%$ indicative of high levels of heterogeneity. In the event of high levels of statistical heterogeneity, we will conduct a random-effect meta-regression and examine characteristics such as study design, publication year, setting (eg, community dwelling, long-term care facilities) and sample characteristics (ie, mean age, proportion female).

We will use forest plots, Egger's test and Duval and Tweedie's trim-and-fill method to assess the presence of publication bias if 10 or more articles are included in a meta-analysis. We will use the 'meta' package in R V.3.6.1 (The R Foundation for Statistical Computing, Vienna, Austria) to implement all meta-analytical procedures.

Risk of bias

Two raters will independently assess the risk of bias of all included articles using the Cochrane Risk of Bias

Tool-Version 2 for randomised controlled trials[37] or the Newcastle-Ottawa Scale for observational studies (http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp).[38] Raters will resolve disagreements by consensus. A third rater will arbitrate cases for which consensus is unreachable. The proposed systematic review and meta-analysis will be reported in conformity with the Meta-analysis of Observational Studies in Epidemiology[39] and PRISMA[31] guidelines. We will also critically appraise the review using the second version of A MeaSurement Tool to Assess systematic Reviews 2.[40]

Timeline for systematic review

Pilot screening was initiated on 3 December 2019. We anticipate data extraction will begin in April 2020 and a draft manuscript will be completed by December 2020.

Patient and public involvement

Patients and the public were not involved in the design or planning of the study.

Ethics and dissemination

We do not require formal ethics approval because the review will draw on publicly available scientific literature. We will present our findings in a peer-reviewed journal and at relevant conferences. Any amendments made to the protocol during the conduct of the review will be reported in the manuscript.

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