Psychological Interventions for Children with Functional Somatic Symptoms: A Systematic Review and Meta-Analysis

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Objective To analyze the effectiveness of psychological treatments on symptom load and associated disability in children with functional somatic symptoms, and to explore potential moderators of effects.

Study design Cochrane, PubMed, PsycINFO, EMBASE, and CINAHL were searched for randomized controlled trials published in peer-reviewed journals. Randomized controlled trials studying the effect of a psychological treatment on symptom load and disability in children with functional somatic symptoms were selected. Data on symptom load, disability, and school absence directly post-treatment and at follow-up were extracted by 2 assessors. Studies were appraised with the Cochrane risk of bias tool. Standardized mean differences were pooled in a random-effects model. Heterogeneity in effect-sizes was explored by use of meta-regressions. PROSPERO Registration ID: CRD42015029667.

Results Out of 4098 identified records, 27 studies were included in this review of which 21 were included in meta-analyses. Psychological treatments reduced symptom load (Hedges g = –0.61), disability (Hedges g = –0.42), and school absence (Hedges g = –0.51) post-treatment in children suffering from various functional somatic symptoms. Effects were maintained at follow-up. Type and duration of symptoms, age, and treatment dose did not explain heterogeneity in effect-sizes between studies. Effect-sizes should be interpreted with caution because of the variety in outcome measures, unexplained heterogeneity in found effects and potential publication bias.

Conclusions Psychological interventions reduce symptom load, disability, and school absence in children with functional somatic symptoms. Future research should clarify which patient and treatment characteristics modify outcomes. *(J Pediatr 2017;■■:■■-■■).*

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Functional somatic symptoms are physical symptoms that are not fully explained by a well-defined medical psychiatric or somatic illness, such as pain and fatigue. Functional somatic symptoms are common in childhood and can become very persistent and disabling.[1-4] Unfortunately, it is mostly unclear how children with functional somatic symptoms are best treated, although growing evidence suggests that psychological interventions can be beneficial.[5-7]

It is an ongoing discussion as to whether different functional somatic symptoms represent distinct illnesses, subtypes of the same overarching syndrome,[8-10] or are purely an artifact of medical specialization.[11] Factor analyses in the general population indicate the existence of 3 or 4 main functional somatic symptoms clusters in children: gastrointestinal symptoms, pain, general or pseudoneurologic symptoms including fatigue, and cardiopulmonary symptoms.[12-16] Based on the subspecialty involved, treatments for functional somatic symptoms have so far been separately investigated for children with gastrointestinal symptoms, fatigue, headaches, and musculoskeletal pains.[5,6,17] Psychological treatments have been found to be effective for adults with various functional somatic symptom clusters, regardless of their main symptoms, indicating that these patients can be treated by comparable therapies.[18-20] Different functional somatic symptom clusters often co-occur in pediatric patients, seem to be driven by a strong general factor, and share psychological and social risk factors.[21-25] Yet, it remains unknown if children suffering from different functional somatic symptom clusters respond similarly to psychological treatments. More knowledge about this could aid in the organization of high quality and cost-effective healthcare for all pediatric patients with functional somatic symptoms.[9]

Effectiveness of psychological interventions may not only depend on the functional somatic symptoms treated but could also depend on other characteristics such as symptom severity, comorbidities, the age of the patient, and the treatment dose and content of psychological intervention.[26] These patient and treatment characteristics and their potential influence on outcomes have not yet been

CAU Care as usual

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described or analyzed.[5,6,17] Yet, such an overview of investigated psychological treatments for children with functional somatic symptoms is essential in allocating children to the most appropriate treatment.

We aimed to investigate the effectiveness of psychological treatments on symptom load and disability in children with various functional somatic symptoms. In addition, we described the characteristics of the included participants and investigated treatments, and we analyzed the effects of these characteristics on treatment outcomes.

Methods

A protocol of this review was registered in November 2015 (https://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015029667).

Studies were considered eligible when they described a randomized controlled trial, which investigated the effect of a psychological treatment vs any other intervention or a waiting list condition on symptom load and disability in children with functional somatic symptoms, as reported by the child/parent. Only studies with ≥10 participants in both treatment arms at the end-of-treatment assessment were included. For meta-analyses, only studies, which compared psychological treatment with waiting list, care as usual (CAU), or placebo were included.

In line with recent reviews, we defined "psychological treatments" as treatments designed to alter psychological processes that may influence functional somatic symptoms,[7] such as psycho-education, cognitive behavioral therapy, acceptance and commitment therapy, relaxation, hypnosis, coping skills training, biofeedback, and narrative therapies.

Functional somatic symptoms were defined as physical symptoms not fully explained by a well-defined medical psychiatric or somatic illness. Thus, studies on participants with chronic pain complaints because of, for example, migraine or juvenile arthritis, were excluded.

When studies included mixed populations (eg, participants with tension-type headache and migraine), these studies were included if they fulfilled 1 of the following 2 criteria. The subgroup fulfilling our inclusion criteria was separately analyzed or at least 70% (with a minimum of 10 participants in both arms) of all participants fulfilled our inclusion criteria at the end-of-treatment assessment.

Search Strategy and Information Sources

We searched Cochrane, PubMed, PsycINFO, EMBASE, and CINAHL in December 2015 for randomized controlled trials published in peer-reviewed journals between 1975 and November 2015. For the concepts "child/adolescent," "functional somatic symptoms," "psychological treatment," and "randomized controlled trial," mesh terms, synonyms, or closely related nomenclature were specified (as shown in our registered protocol for the used search string in PubMed). Searches were conducted without restrictions on language. However, only English search terms were used.

Study Selection

The titles and abstracts of all identified records were appraised for inclusion by 2 assessors based on prespecified eligibility criteria, after removal of duplicates. Hereafter, full text articles of all potentially relevant records included in the first phase were examined for inclusion and exclusion criteria. In both selection phases any discrepancies were resolved through discussion, and the kappa estimate of initial agreement between assessors was calculated. In case of disagreement, a third assessor was consulted.

Data Collection Process and Data Items

Data from included studies were independently extracted by 2 authors by use of a structured form, developed a priori. Disagreements were solved through discussion or when needed by consulting a third assessor. The extraction form included the aim and the design of the study, participant characteristics, details of the intervention provided based on the Tidier checklist,[27] outcome details, and effects. The authors of 11 studies were contacted to obtain missing outcome data. Seven authors were able to provide data.

Risk of Bias in Individual Studies

Two assessors appraised the risk of bias.[28] Discrepancies were resolved through discussion. The Cochrane risk of bias assessment tool consists of 5 main domains which can be rated as "low," "high," or "unclear."[28] Because blinding of participants and therapists is usually not possible for psychological treatments, only the blinding of outcome assessors was rated. Selective outcome reporting was marked as unclear when no trial registration or study-protocol was available or when one of our main outcomes was not fully reported in the article.

The methodological quality of studies and treatments was assessed with the psychotherapy outcome study rating scale by 2 assessors.[29] This instrument consists of 21 items that can be rated poor ("0"), fair ("1"), or good ("2"). The **Appendix** (available at www.jpeds.com) provides a detailed description of the assessed items.

Summary Measures

We were interested in the outcomes symptom load and disability. Studies measured symptom load by assessing symptom intensity or severity, frequency, and/or duration. Some studies reported school absence as a measure of disability instead of, or in addition to, physical functioning or quality of life. We therefore, decided to include school absence as a second outcome of disability. When the concepts symptom load or disability were assessed with more than 1 measure, outcomes from specific, validated, and multiple-item tools were preferred over those from nonspecific, nonvalidated, and single-item tools. When outcomes were equally valid, the one most used in other studies was chosen.

Synthesis of Results

Almost all studies reported outcomes with continuous measures. Therefore, Hedges g was calculated for the 3 outcomes: symptom load, disability, and school absence post-treatment,

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