Barriers and facilitators of physical function, activity, sports and exercise in children and adolescents with spinal pain: a protocol for a systematic review and meta-ethnography

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ABSTRACT
Introduction Spinal pain is one of the leading causes of disability, with the incidence of adolescent back pain estimated at 20%. Multiple barriers influence exercise participation in adolescents. However, there remains a lack of literature surrounding patients’ choice to exercise, perceived barriers and facilitators of exercise, and their relationship to participant demographics. The aim of this systematic review with meta-ethnography will be to identify the barriers and facilitators of exercise participation among adolescents with thoracic or lower back pain (LBP). The secondary aim will be to identify any trends in barriers and facilitators of exercise between different demographic groups within children or adolescents under 18 years.

Methods and analysis The seven-phase process identified by Noblit and Hare’s meta-ethnography approach will be used. A comprehensive electronic search of databases (AMED, CINAHLplus, EMBASE, MEDLINE, SCOPUS, Nursing & Allied Health, PubMed, PsycINFO, SPORTDiscus, Social Science Database) will be completed during April 2022. Grey literature using reference lists, websites and search engines will also be searched in accordance with Peer Review of Electronic Search Strategies (PRESS) guidelines. Inclusion criteria include: (A) qualitative studies, (B) participants under 18 years experiencing thoracic or LBP, (C) identification of barriers and facilitators of exercise participation in exercise, sports or physical activity and (D) primary research. This systematic review with meta-ethnography review aims to generate theories of behaviours and interpret significance across multiple studies. This process aims to develop future physiotherapeutic behavioural interventions, inform service provision and identify possible future research questions.

Ethics and dissemination No ethical approval was required due to the nature of using previously published work to form a systematic review paper. This systematic review and meta-ethnography will be disseminated through both conference presentations and journal publications. No funding was received for this review.

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STRENGTHS AND LIMITATIONS OF THIS STUDY
⇒ This review has been written according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols checklist to promote methodological quality and reporting transparency.
⇒ Methodology has been guided by the seven phases of Noblit and Hare’s meta-ethnography, Joanna Briggs Institute Manual for Evidence Synthesis, PRESS guidelines and the Cochrane Handbook Systematic Reviews.
⇒ Data extraction was performed by the first reviewer (ST), quality checked by the second reviewer (AS) and any disputes discussed by a third reviewer (SA).
⇒ This review was limited to papers written in English with non-English studies excluded but recorded in results.

INTRODUCTION
Rationale Thoracic and lumbar spinal pain are highly prevalent in the UK with lower back pain (LBP) being the largest single cause of disability affecting approximately one-third to one-half of the population.1 2 Thoracic spinal pain is estimated at 1.4% in adults and 34.8% in children aged 12 years with a higher prevalence in females.3 The incidence of adolescent back pain is estimated at 20% with increasing prevalence with age.4 Approximately 10% of adolescents experienced thoracic spinal pain that interferes with school or leisure.5 Pathoanatomical conditions such as scoliosis and Scheuermann’s kyphosis, and non-pathoanatomical conditions are associated with spinal pain, which often present as non-specific and self-limiting.1 Extensive work has been done into adult LBP and physiotherapeutic care.6 However, the prevalence of adolescent spinal pain and lack of

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literature has led to questions surrounding efficiency and effectiveness of care. Among all adolescent spinal conditions adolescent idiopathic scoliosis (AIS) is the most common, present in 2%–3% of children under 16 years, and characterised by a three-dimensional deformity.6 7 AIS is associated with back pain, discontent with body image and contributes to a high percentage of thoracic spinal pain.8 9 Physiotherapeutic treatment modalities such as exercise are associated with reduced spinal pain, improved mental and physical well-being, self-esteem and quality of life in AIS.8 10 11 Despite the prevalence of AIS and the benefits of exercise, only a small number of qualitative studies exist examining barriers and facilitators of exercise participation, with a lack of consensus to shape physiotherapeutic care.12 To the best of the authors knowledge only two qualitative studies have examined factors influencing physical activity (PA) or function in AIS. Both studies identified activity limitations due to the impaired body structure, and emotional and environmental factors.13 14 However, neither study directly examined participation in exercise, sport or PA in AIS. Considering the lack of clarity in the literature and poor methodological quality regarding barriers and facilitators of exercise in AIS, this systematic review was expanded to include children and adolescents with any kind of thoracic or lumbar spinal pain.

The UK government and National Health Service and National Institute for Health and Care Excellence recommend children and adolescents engage in PA, for a minimum of 60 min daily.15–17 Both PA and exercise are defined as movement resulting in energy expenditure correlated with fitness, however, exercise incorporates a plan and structure with the intention of improving specific fitness components.18 Qualitative research suggests that increasing PA promotes a sense of well-being and fitness, reducing adolescent LBP and facilitating function.4 19 20 Adolescents typically report positive attitudes towards PA with social connection, enjoyment and safe environments being key facilitators.21 22 Highly structured or competitive activities, peer pressure and uniforms have been identified as barriers to exercise in healthy children and adolescents.23 Young people with disabilities reported a lack of opportunity, access and fear of reinjury as barriers to PA.21 23 Despite the benefits of exercise, many children remain inactive, with variability according to gender, ethnicity and socioeconomic status.17 24 There is very little consensus regarding barriers and facilitators of PA, sports and exercise in children and adolescents with spinal pain, particularly once an individual has left a rehabilitation setting.4 20 Research is needed that can bring this detail together to establish consistencies and differences across the evidence with recommendations for what can be done to change this. The proposed study aims to examine qualitative data regarding barriers and facilitators of exercise participation in children and adolescents under 18 years.

Study objectives
1. To explore barriers and facilitators of exercise participation in adolescents with diagnosed spinal complaints, thoracic or LBP.
2. To examine the qualitative data for themes or differences in barriers and facilitators of exercise participation across discrete subpopulations, such as AIS.

METHODS
Qualitative meta-synthesis is valuable in gathering knowledge in healthcare research.24 To prevent duplication or publication bias and improve quality of reporting, this protocol has been registered with the international prospective register of systematic reviews (PROSPERO).25Systematic review with meta-ethnography was chosen due to its value in generating models, or theories of behaviour and experiences, and reinterpreting significance across multiple studies.26

Research design
This systematic review with meta-ethnography will enable the researcher to identify any trends in the literature and determine if this can be translated into clinical practice or future research.27 28 The seven phases of Noblit and Hare’s meta-ethnography, as outlined below (see figure 1), will be used as a framework for this project.29–31 Noblit and Hare’s meta-ethnography was chosen as it is suited to complex data and complex questions.29 Furthermore, systematic reviews enable the researcher to gain an informed and up-to-date understanding and summary of the relevant research in this field.30 In addition, the methodology has been guided by the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis33 and the Cochrane Handbook Systematic Reviews.34 Methodological quality and reporting transparency will be guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist for systematic review protocols (online supplemental appendix A).35

This study sits within the subtle-realist paradigm. This has been chosen as qualitative perspectives are to be assessed expressing a pertinent reality.36 Furthermore, subtle realism involves individual perceptions and beliefs reflecting the nature of healthcare research rather than the beliefs of the researcher.37

The first phase, outlined below, involves determining the focus of the synthesis and defining the area of focus for this review to inform.29

Patient and public involvement
This research was conceived following a focus group with expert patients and discussion with a lead spinal surgeon working with adolescents. The team supporting this review have leading expertise in spinal pain (NRH, AR and AG) and qualitative research (AS). All team members have extensive experience in undertaking reviews. All methodological decisions have been discussed and agreed with the research team.
Eligibility criteria
The search concept tool, Sample, Phenomenon of Interest, Design, Evaluation, Research type has been used to inform eligibility.33

Sample
Children or adolescents aged 18 and under experiencing thoracic or lumbar spinal pain or with any diagnosed spinal condition. Studies will be excluded when there is a pure focus on the experience of neck pain. No exclusion criteria will be applied with regard to gender, ethnicity, socioeconomic status or other participant demographics.

Phenomena of interest
Participants with any kind of thoracic or lumbar spinal condition or currently experiencing thoracic or lumbar spinal pain. Studies will include patients who are aiming to or those participating in any kind of PA, exercise or sports. Studies that contain qualitative data from parents or guardians of children or adolescents regarding barriers and facilitators of participation in PA, exercise or sports with spinal pain will be included.

Design
Different types of qualitative methodology will be used including: ethnography, phenomenology, patient
narratives, case studies, grounded theory and action research will all be included.

**Evaluation**
Studies will have to include participant perceived barriers, facilitators, thoughts, feelings, perceptions and beliefs towards exercise, sports and PA. Studies examining participation in PA as part of physiotherapy and rehabilitation following medical interventions will be included, provided barriers and facilitators are examined. Qualitative studies that identify data surrounding obstacles, challenges and quality of life with regard PA, exercise or sports will also be included.

**Research type**
Qualitative studies and mixed-methods studies will be included where there is clear identification, collection and analysis of qualitative data. Conference proceedings, abstracts only, editorials and opinions will be excluded. Articles where the full text is unavailable, articles that only contain quantitative data or that do not identify patient experiences, beliefs or perceptions will be excluded but will be recorded in the results.

**Other**
Studies where the language is not in English will be excluded.

Studies must be translatable for two authors to independently perform the translation and agree that the clarity and language is clear and without substantial error.

**Information sources**
Electronic databases searched will include; AMED, EMBASE, MEDLINE, CINAHL Plus, Sport Discuss, SCOPUS, PubMed, PsycINFO, Nursing & Allied Health Database and Social Science Database.

Grey literature will be searched using reference lists, websites and search engines, for example, Google Scholar. This searching will be done in accordance with the Peer Review of Electronic Search Strategies guidelines.38 Searches will be performed during April 2022 with specific dates listed alongside the database used.

**Search strategy**
Scoping searches informed the search strategy. Below is an outline of the search strategy however, the strategy will be tailored for each database (table 1).33 Please see online supplemental file 1 for the precise, full search strategy.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Search strategy</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>‘Adolescent’ OR ‘child’ OR ‘teen’ OR ‘youth’ OR ‘young person’ OR ‘juvenile’*</td>
</tr>
<tr>
<td>2</td>
<td>‘Back’ OR ‘Spinal’ OR ‘Thoracic’</td>
</tr>
<tr>
<td>3</td>
<td>‘Barrier’ OR ‘Facilitator’ OR ‘reason’ OR ‘feeling’ OR ‘belief’ OR ‘Obstacle’ OR ‘challenge’</td>
</tr>
<tr>
<td>4</td>
<td>‘exercise’ OR ‘physical activity’ OR ‘sport’ OR ‘Physical’ OR ‘Activ’*</td>
</tr>
<tr>
<td>5</td>
<td>‘Questionnaire’ OR ‘focus group’ OR ‘interview’</td>
</tr>
<tr>
<td>6</td>
<td>‘participation’ OR ‘Quality of Life’ OR ‘QOL’</td>
</tr>
<tr>
<td>7</td>
<td>‘qualitative’ OR ‘Mixed Method’ OR ‘Narrative’ OR ‘grounded theory’ OR ‘Phenomenology’ OR ‘ethnography’ OR ‘action research’ OR ‘case studies’</td>
</tr>
<tr>
<td>8</td>
<td>1 AND 2 AND 3 AND 4 AND 5 AND 6 AND 7</td>
</tr>
</tbody>
</table>

Search terms will include Boolean operators such as ‘AND’ and ‘OR’. Truncation (*) will also be utilised to ensure all appropriate articles are retrieved.

Each stage will be visible with appropriate explanation will be given.

**Selection process**
All articles identified will be assessed for eligibility during phase 2.29 First, articles retrieved will be screened by title followed by screening by abstract for eligibility against the predefined criteria. Screening will be performed by the first researcher (ST) and any uncertainty discussed with the second reviewer (AS), any further disagreements regarding screening will be discussed with the third reviewer (SA).

Phase 3 involves reading the studies and noting phrases and metaphors to determine whether the article is relevant to the area of interest.29 Where there is insufficient information to determine if an article meets inclusion criteria the lead researcher will make two attempts via email to contact the lead author over a 4-week period. If no response is received, then the study will be excluded on the grounds of insufficient information.

Study selection during phase 2 and phase 3 will be determined by the first researcher with consultation of a second reviewer (AS) and any disagreements resolved with involvement of a third reviewer (SA) as required.42

**Data collection process**
Studies will be examined to determine how they are related for synthesis as outlined in phase 4.30 Key phrases, metaphors, ideas and concepts will be listed for juxtaposition.30 Consideration of the studies theoretical approach, conceptual meanings and metaphors will facilitate determination of the studies relationships.31 A table will be used to display commonalities and differences among concepts within and between studies.30 Use of the JBI checklist for qualitative research critical appraisal tool (JBICQR) will facilitate this process.43 This process will be undertaken by the lead researcher (ST) with data checked by the
second reviewer (AS) and any disagreements discussed with the third reviewer (SA) to aid credibility.\textsuperscript{33}

Where there are insufficient or missing data, the lead researcher will make two attempts to contact the author via email over a 4-week period.

**Data items**
During phase 5, studies will be translated into one another.\textsuperscript{29} The meaning of phrases, metaphors, ideas and concepts will be compared across study accounts.\textsuperscript{30} Translation will be idiomatic taking account of the studies context, rather than literal, a central practice in meta-ethnography.\textsuperscript{30, 31} The type of translation will be determined by the studies that are identified from the search strategy. Reciprocal translation will be used if studies contain similar themes allowing them to be ‘added together’.\textsuperscript{31} Conversely, if studies contain different theories or ideologies then refutational translation can be used.\textsuperscript{29, 30} Studies will be grouped either by their conceptual focus or by their common concepts.\textsuperscript{29}

Results of individual studies will be presented and tabulated. First, summary data for each study and the demographics of each group between studies will be presented. Second, frequency of qualitative statements and proportions of different demographic groups will be represented using statistical proportions to enable identification of generalisability and applicability. Data will be checked by the second researcher (AS) and tabulated to ensure it is clear to the reader.\textsuperscript{29}

**Outcomes and prioritisation**
Information on study characteristics, sample demographics, nature of pathology and qualitative responses will be examined with conclusions extracted.\textsuperscript{27} The JBICQR will be used to determine, first and second order constructs. First order constructs relate to participants quotations, second order constructs relate to the researchers’ impressions.\textsuperscript{29} The first researcher will select participant quotes to support second order constructs, however, the difference between participant quotes and researcher impressions cannot be examined in isolation therefore allowing interpretations to be made.\textsuperscript{29} Critical appraisal tools used during the synthesis will be included in the review appendices.\textsuperscript{33}

For each theme identified during study translation in phase 5, the effect measure will be determined. For example, the number of participants who have the same response theme or the number of different responses identified.

**Risk of bias in individual studies**
There is literature to suggest that meta-ethnography presents some methodological challenges therefore this paper will critically appraise studies during translation, comparison and synthesis.\textsuperscript{26} From the articles identified those included in the review will each be quality assessed using the JBICQR.\textsuperscript{43} The JBI checklist was chosen for its associated validity and coherence.\textsuperscript{44} Studies will be selected based on their ability to answer the research question followed by quality appraisal, rather than initial exclusion based on quality.\textsuperscript{45} This process will be undertaken by the lead researcher (ST) with data checked by the second reviewer (AS) to establish consistency with any concerns discussed with the third researchers (SA).

The trustworthiness of the included studies will be critically appraised by the first researcher (ST) and discussed with the second researcher (AS). Quality will be assessed using the JBICQR\textsuperscript{46} and the confidence in the evidence from reviews of qualitative research (GRADE-CERQual) tool.\textsuperscript{47} Quality will be presented according to between study assessment and within tool assessment.

Each study included in the review will be cited and its characteristics detailed as outlined above.

**Data synthesis**
Phase 6 involves taking translations identified in stage 5 and comparing them to identify common overarching themes and develop interpretations.\textsuperscript{30} Synthesis results will be tabulated to visually display results between studies and characteristics between demographic groups.\textsuperscript{29} This is a second level synthesis that goes beyond the findings of an individual study towards theory development.\textsuperscript{29, 30} This phase enables the first researcher (ST) to determine final themes and will be discussed with the second (AS) and third researcher (SA) to help reduce bias and errors in data extraction.\textsuperscript{29, 33} The nature of the synthesis is that detailed data will be reported to provide support for the inferences made.\textsuperscript{48} It is possible that multiple lines of argument may be identified from the meta-ethnography, these can be combined into one theory.\textsuperscript{29} Themetic synthesis enables conclusions to be drawn based on common elements across heterogeneous studies.\textsuperscript{29} This section of the review will include details of the type of data extracted such as methods, setting and population characteristics due to their influence on generalisability.\textsuperscript{33} During this stage, articles will be reread to ensure interpretations are grounded within original studies.

Finally, phase 7 involves expressing the synthesis. This involves translation of findings into a suitable format for the audience.\textsuperscript{30} One of the strengths of meta-ethnography is its ability to move beyond concept development to theory development and advance the evidence base for decision making.\textsuperscript{29}

**Meta-bias**
For each synthesis identified during stages 5 and 6, quality will be summarised among contributing studies. All results from synthesis conducted will be visible in a table of results with a summary of meta-ethnography performed, with themes modelled during the output and moderated by a certainty assessment. Direction of effect between groups will also be stated.\textsuperscript{49}
Any missing results will be identified and made clear to the reader with reasons why to help reduce reporting bias

Confidence in cumulative evidence
Assessment of bias resulting from missing results in the synthesis (reporting bias) will be made clear throughout the stages of ethnographic synthesis. Data will be examined for quality using the Joanna Briggs Institute critical appraisal checklist for qualitative research (JBICQR). The JBICQR was chosen over other tools for its sensitivity and validity in the evaluation of qualitative studies.

Methodological and analytical transparency will be promoted throughout to enable the reader to determine if reasonable arguments and judgements are made. A further benefit of meta-synthesis is that it can be used for the underpinning and justification of health policy, therefore, expression for stakeholders is of the upmost importance in moving the physiotherapy profession forwards.

Each outcome will be assessed for certainty of evidence and confidence in each outcome. Qualitative data analysis using the JBICQR will be stated to present the robustness of synthesised results. GRADE-CERQual assesses the quality of review findings by the theme generated from the synthesis. The assessment considers rating the level of concern (no concern or very low, low, moderate and serious) across four criteria: (A) methodological limitations (using JBI quality assessment), (B) relevance, (C) accuracy and (D) coherence. These four elements are brought together to determine confidence in evidence across a four-point scale (high, moderate, low or very low confidence).

DISCUSSION
PA, sports and exercise have been shown to be beneficial in reducing spinal pain, improving quality of life and reducing hospital admissions. However, many people with spinal conditions and spinal pain report barriers to exercise and PA limiting their participation. There is a small body of qualitative literature regarding barriers and facilitators of exercise in adolescents with spinal conditions. However, to the best of our knowledge, no work has been done to synthesise this evidence or identify any trends in conditions, age, gender, ethnicity, socioeconomic status or other demographics.

Social influences, self-efficacy, positive impacts on health and mental health, as well as enjoyment have been identified as facilitators to PA in youth with spina bifida. Meanwhile, motivation and meaningfulness are primary facilitators of PA and high-intensity exercise in spinal cord injury. Conversely, lack of knowledge, control and inaccessible environments have been identified as barriers to PA. Through developing understanding of barriers and facilitators of exercise, clinicians are more likely to provide programmes that encourage adherence with consistent health benefits. Furthermore, extending rehabilitation services and physiotherapy to when the individual returns to the community, with contextual understanding, aids individuals to overcome relevant barriers. Beneficially, increasing depth of understanding regarding facilitators of PA decreases burden on family members and relationships, as well as increasing independence with functional and daily activities. It is clear from the literature that barriers and facilitators of exercise are multiple and varied and include personal and environmental factors, societal influences and physical barriers. Understanding trends in barriers and facilitators of exercise in adolescents facilitates an individualised approach to PA and informs future intervention programmes.

Due to the numerous benefits of PAy, and the importance of understanding qualitative factors in physiotherapeutic care, this systematic review aims to identify key barriers and facilitators of exercise in the adolescent population and identify if there are any trends in participant demographics.

Dissemination
This systematic review and meta-ethnography will aim to be disseminated through both conference presentations at Physiotherapy UK 2023, World Congress of Physiotherapy 2023 and targeted journal publications. Possible journals include Spine (impact Factor: 2.692) or PlosOne (impact factor 3.24).

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Contributors Study conceived by NRH, AS, AG, AR, SA, ST, with all authors contributing to shaping the design and methods. ST drafted the manuscript with guidance from AS and NRH. All authors contributed to the revising and redrafting the manuscript. The final version was approved by all authors with agreement to submission to BMJ Open. AS is the guarantor of the work, with ST the corresponding author.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

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REFERENCES


