Understanding Role of Physical Rehabilitation in Pain and Quality of Life among Children with Paediatric Tumours: A Qualitative Systematic Review Protocol

Rutuja Sawalkar, Sharath Hullumani, Shrutika Sharad, Aishik Ghosh, Irshad Qureshi

Submitted to: JMIR Research Protocols
on: September 09, 2025

Table of Contents

Understanding Role of Physical Rehabilitation in Pain and Quality of Life among Children with Paediatric Tumours: A Qualitative Systematic Review Protocol

Rutuja Sawalkar[1*] BPT, MPT; Sharath Hullumani[1*] BPT, MPT, (PhD); Shrutika Sharad[1*] BPT, MPT; Aishik Ghosh[1*] BPT, MPT; Irshad Qureshi[2*] BPT, MPT, (PhD)

[1] Faculty of Paediatric and Neonatal Physiotherapy Datta Meghe Institute of Higher Education and Research (DU) Wardha IN
[2] Faculty of Neuro Physiotherapy Datta Meghe Institute of Higher Education and Research (DU) Wardha IN
[*]these authors contributed equally

Corresponding Author:
Sharath Hullumani BPT, MPT, (PhD)

Faculty of Paediatric and Neonatal Physiotherapy
Datta Meghe Institute of Higher Education and Research (DU)
Sawangi Meghe
Wardha
IN

Abstract

Background: Children with paediatric tumours often experience persistent pain and significant reductions in quality of life due to both the disease and its treatment. While medical and pharmacological interventions are widely used, the role of physical rehabilitation in alleviating pain and enhancing quality of life has gained increasing attention. A qualitative systematic review is essential to synthesise existing evidence and capture the lived experiences of children, their families, and healthcare providers.

Objective: This review aims to explore and synthesise qualitative evidence on the role of physical rehabilitation in managing pain and improving quality of life among children diagnosed with paediatric tumours.

Methods: A systematic search will be conducted across electronic databases (e.g., PubMed, Scopus, CINAHL, PsycINFO, and Cochrane Library) to identify qualitative and mixed-methods studies that investigate physical rehabilitation interventions in children aged 0–18 years with paediatric tumours. Data extraction will include study characteristics, intervention details, and reported experiences related to pain and quality of life. A thematic synthesis approach will be used for analysis. Studies will be excluded if they focus exclusively on adults, non-tumour conditions, medical or pharmacological interventions without rehabilitation, or if they lack qualitative data.
Expected Outcomes:
This review will provide a comprehensive understanding of how physical rehabilitation influences pain management and quality of life in paediatric oncology settings. Findings will inform clinical practice, guide rehabilitation program development, and identify gaps for future research.
PROSPERO international database : CRD420251062517

(JMIR Preprints 09/09/2025:83818)
DOI: https://doi.org/10.2196/preprints.83818

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✔ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http
No. Please do not make my accepted manuscript PDF available to anyone. I understand that if I later pay to participate in <a href="https:/

Original Manuscript

Understanding Role of Physical Rehabilitation in Pain and Quality of Life among Children with Paediatric Tumours: A Qualitative Systematic Review Protocol

Abstract

Background:

Children with paediatric tumours often experience persistent pain and significant reductions in quality of life due to both the disease and its treatment. While medical and pharmacological interventions are widely used, the role of physical rehabilitation in alleviating pain and enhancing quality of life has gained increasing attention. A qualitative systematic review is essential to synthesise existing evidence and capture the lived experiences of children, their families, and healthcare providers.

Objective:

This review aims to explore and synthesise qualitative evidence on the role of physical rehabilitation in managing pain and improving quality of life among children diagnosed with paediatric tumours.

Methods:

A systematic search will be conducted across electronic databases (e.g., PubMed, Scopus, CINAHL, PsycINFO, and Cochrane Library) to identify qualitative and mixed-methods studies that investigate physical rehabilitation interventions in children aged 0–18 years with paediatric tumours. Data extraction will include study characteristics, intervention details, and reported experiences related to pain and quality of life. A thematic synthesis approach will be used for analysis. Studies will be excluded if they focus exclusively on adults, non-tumour conditions, medical or pharmacological interventions without rehabilitation, or if they lack qualitative data.

Expected Outcomes:

This review will provide a comprehensive understanding of how physical rehabilitation influences pain management and quality of life in paediatric oncology settings. Findings will inform clinical practice, guide rehabilitation program development, and identify gaps for future research.

PROSPERO international database : CRD420251062517

Key words:

Cancer; Tumour; Children; Blood Cancer

INTRODUCTION

Paediatric tumours impose a substantial global health burden. An estimated more than 250 000 children and adolescents (aged 0–18) are diagnosed with cancer each year worldwide and cancer remains the leading disease-related cause of death in children under 15 [(1)]. Five-year survival now

approaches 80% or greater in high-income countries, creating a growing population of young survivors who experience chronic sequelae of treatment. In 2017 childhood cancers accounted for roughly 11.5 million disability-adjusted life-years (DALYs) globally, making paediatric cancers the sixth leading cause of overall cancer burden and the ninth leading cause of paediatric disease burden worldwide (2). These figures underscore that despite treatment advances, childhood cancer remains a major contributor to mortality and morbidity, especially in resource-limited settings.

Children with cancer suffer a high symptom burden, with pain and quality-of-life (QoL) outcomes as critical clinical concerns. Pain is one of the most common and distressing symptoms reported by paediatric oncology patients and their families[3]. Studies indicate that a substantial proportion of children undergoing cancer therapy experience moderate to severe pain, from tumour-related pain, treatment procedures, neuropathy and other causes (3). Such pain can significantly impair daily functioning, psychosocial well-being and participation in age-appropriate activities. In parallel, cancer treatment produces myriad adverse effects – pain, fatigue, muscle weakness, neuropathy, reduced range of motion, balance and gait deficits, etc. – that profoundly impact health-related QoL (4). For example, impairments in mobility or strength and cancer-related fatigue have been directly linked to diminished physical functioning and QoL in this population. Thus, alleviating pain and optimizing QoL are major objectives of paediatric cancer care. These outcomes affect not only the child's physical health but also psychological well-being, social integration and family quality of life. In response to this burden, physical rehabilitation – particularly physical therapy (PT) – has emerged as an important component of comprehensive paediatric oncology care. By focusing on movement sciences, PT aims to attenuate deconditioning and to restore function of the musculoskeletal, neurologic, respiratory and other systems(5). Integrating structured exercise, mobility training and other PT interventions during and after treatment can help mitigate the rapid physical deconditioning that occurs with prolonged bedrest and intensive therapies (5), (6). Early rehabilitation engagement may limit the severity of treatment-related sequelae, help children maintain functional independence, and ultimately improve their QoL (7) (8). Indeed, preliminary studies (largely pilot and feasibility trials) have demonstrated that hospital- and home-based exercise programs for children with cancer are safe and potentially beneficial for fatigue, strength, and physical function (9). Physical therapists, working closely with oncology teams, are uniquely positioned to optimize functional outcomes, muscle mass, and cardiopulmonary fitness in these patients (5). Moreover, there is growing consensus that rehabilitation should be integrated across the paediatric cancer continuum – from diagnosis through survivorship – to monitor and address late effects of therapy (4) (6).

Despite this promise, the evidence base for paediatric oncology rehabilitation remains limited and its implementation is far from universal. The recent literature consists largely of small case series, pilot trials, and single-centre studies. For example, a 2019 scoping review identified only 12 studies of PT interventions for childhood cancer (mostly single-arm or feasibility designs) and concluded that current evidence is not yet sufficient to inform clinical practice (10). Systematic reviews of rehabilitation in paediatric cancer have likewise noted that while general exercise programs can improve activity and participation, rigorous trials of PT-specific interventions are lacking (11). Health-care providers report that rehab services are grossly underutilized: in one survey only about 25% of children with cancer ever received rehabilitation referrals, typically reserved for severe post-surgical deficits(12). Correspondingly, large registry and cohort studies show that only a minority of children with treatment-related impairments access rehab. For instance, a retrospective cohort of acute lymphoblastic leukaemia patients found that only 27.2% received any rehabilitation in the first year of care, and among long-term survivors of childhood cancer merely 9.3% had ever used PT services (13). Barriers cited include lack of dedicated funding and specialized paediatric oncology rehab programs, limited provider awareness, and insufficient guidelines or space/equipment to deliver age-appropriate services (14). Recent guidelines and expert consensus statements have begun to acknowledge the need for rehabilitation, recommending activities like referral to PT for chronic pain or fatigue management, yet high-level evidence and practical recommendations remain scarce. In short, rehabilitation's vital role in attenuating disability is increasingly recognized but formal integration into paediatric cancer care lags behind that in adult oncology (15).

Crucially, while quantitative outcomes of rehabilitation have been investigated to some degree, the experiential dimension remains poorly understood. Qualitative research in paediatric oncology is growing, yet existing qualitative syntheses have focused on general cancer experiences, psychosocial coping, or family perspectives (16). To our knowledge, no systematic review has specifically synthesized children's or parents' experiences with rehabilitation interventions and their perceptions of impact on pain and QoL. Given the unique developmental and psychosocial context of paediatric cancer, understanding patient and family perspectives is essential to inform patient-centred care. Thus, a qualitative systematic review is warranted to aggregate and interpret evidence on how physical therapy and rehabilitation affect symptoms, well-being, and daily life in this population.

The aim of the present study is to perform a qualitative systematic review of the effect of paediatric rehabilitation on pain and quality of life in children with tumours, synthesizing patient and caregiver experiences to inform clinical practice and future research.

Methods

This qualitative systematic review will be conducted as a meta-synthesis following Joanna Briggs Institute (JBI) methods and reported in accordance with PRISMA-P guidelines. The protocol will be prospectively registered in the PROSPERO international database (CRD420251062517) and will adhere to the PRISMA-P checklist for reporting. The review aims to synthesize evidence on children's and families' experiences of rehabilitation interventions for paediatric tumour patients, with a focus on pain and quality-of life outcomes.

Research question?

How do children with paediatric tumours, their families, and healthcare providers perceive the role of physical rehabilitation in managing pain and improving quality of life?

Eligibility Criteria

We will include primary studies of children (typically <18 years old) with any paediatric tumour (malignant or benign) who have received rehabilitation interventions (e.g. physical therapy, occupational therapy, exercise programs, cognitive rehabilitation, palliative rehabilitation, etc.) during or after cancer treatment. All studies must report qualitative data (themes, narratives, or participant quotes) concerning the effects or experiences of rehabilitation on pain and/or quality of life from the perspective of children, their caregivers or clinicians. Studies will be excluded if they focus on populations outside the target group, such as adults above 18 years with cancer or children with non-tumour conditions like cerebral palsy or muscular dystrophy. Research that investigates only medical, surgical, or pharmacological interventions without incorporating any physical rehabilitation component will not be considered. Similarly, studies limited to complementary or alternative therapies such as yoga, acupuncture, or massage, unless integrated within a structured rehabilitation program, will be excluded. Publications that do not address outcomes related to pain or quality of life, or that report solely on biomedical or survival endpoints, will also be omitted. In terms of methodology, purely quantitative studies without qualitative data, narrative reviews, editorials, commentaries, conference abstracts without full data, and grey literature lacking peer review will not be included. Finally, non-English language studies without accessible translation, as well as articles published outside the defined timeframe (if applied), will be excluded from the review.

Study designs: We will include qualitative studies (e.g. phenomenology, grounded theory, ethnography, case study, narrative) and mixed-methods studies that present extractable qualitative findings. Any study that provides relevant qualitative information (e.g. survey with open-ended responses, qualitative component of a trial) will be eligible. No restrictions will be placed on publication
date.

Language: We will consider studies in all languages. Non-English articles of which translation in English is available. We will exclude studies that do not report original qualitative data (e.g. editorials, commentaries, review articles), abstracts without full text, or duplicate publications. Studies focusing exclusively on adult patients or on non-cancer populations will be omitted. Reports without clear data on paediatric rehabilitation, pain, or quality-of-life experiences will also be excluded. All eligibility decisions will be guided by these criteria.

Information Sources and Search Strategy

A comprehensive search strategy will be developed with an information specialist. We will search major bibliographic databases in English and Chinese, including but not limited to: MEDLINE (via PubMed), Embase, CINAHL, PsycINFO, Cochrane Library, Web of Science, and Scopus for English-language literature. The search strategy will combine controlled vocabulary (e.g. MeSH, CINAHL
headings) and free-text terms related to paediatric cancer (e.g. childhood cancer, paediatric tumour, leukaemia, neuroblastoma, lymphoma, brain tumour), rehabilitation interventions (e.g. rehabilitation, physical therapy, exercise, occupational therapy, palliative care), pain, quality of life, and qualitative research (e.g. qualitative, interview, narrative, phenomenology, grounded theory, experience). We will pilot the search strategy in MEDLINE and adapt it for each database. Reference lists of all included studies and relevant reviews will be hand-searched for additional citations. No date limits will be imposed. Details of each database search (date, query) will be recorded.

Study Selection and Data Management

All search results will be imported into reference management software (e.g. EndNote or Covidence) and duplicates will be removed. Two reviewers will independently screen titles and abstracts against the eligibility criteria. Records deemed potentially relevant by either reviewer will move to full-text screening. Two reviewers will then independently assess all retrieved full-text articles for inclusion. Disagreements at any stage will be resolved through discussion or by consulting a third reviewer.

The study selection process will be documented using a PRISMA flow diagram to record numbers of records identified, screened, excluded, and included. Throughout screening we will track reasons for exclusion of full-text articles. All decisions will be logged in the review management software to ensure transparency.

Data Extraction

Data will be extracted independently by two reviewers using a standardized JBI data extraction form. Extracted information will include study metadata (authors, year, country, publication type), participant details (child age range, tumour types, treatment phase), setting (hospital, outpatient clinic, community, rehabilitation centre), description of the rehabilitation intervention(s) (type, frequency, duration), methodology (study design, sampling, data collection methods), and qualitative findings relevant to pain and quality of life. We will capture themes, concepts, and illustrative quotations from the original studies. If a mixed-methods study is included, only the qualitative component will be extracted for synthesis. The two reviewers will compare extracted data for consistency; any discrepancies will be resolved through discussion or by a third reviewer. Extracted data will be managed in a spreadsheet or systematic review software, allowing cross-checking with the original reports.

Quality Appraisal

Two reviewers will independently assess the methodological quality of each included study using the JBI Critical Appraisal Checklist for Qualitative Research. This checklist evaluates criteria such as congruity between research methodology and research questions, adequacy of data collection, representation of participant voices, and ethical considerations. Each item will be rated (yes/no/unclear) and any judgment will be documented. Discrepancies between reviewers will be resolved by discussion and consensus, involving a third reviewer if needed. Studies will not be excluded based on quality alone, but the appraisal will inform the trustworthiness of synthesis findings. We will also note quality of reporting for mixed-methods components.

Data Synthesis

We will synthesize the qualitative data using the JBI meta-aggregation approach. Meta-aggregation treats findings from primary studies as statements to be pooled, without re-interpretation, in order to practical, evidence-based conclusions. Two reviewers will conduct the synthesis independently.

First, we will extract each study’s findings (thematic statements or conclusions) along with

supporting illustrations (quotes or examples). Second, we will group similar findings into categories based on shared meaning. Third, we will aggregate these categories into one or more synthesized findings that represent comprehensive themes across studies. Specifically, meta-aggregation will proceed as a three-step process:

1. Extract all findings and accompanying participant quotations from each study.
2. Develop categories by grouping findings that are conceptually related.
3. Formulate synthesized statements or themes that capture the core insights of each category.

Each synthesized finding will comprise at least two supporting categories (and thus multiple original findings). Throughout synthesis, two reviewers will independently compare categories and themes to ensure reliability of interpretations. Any disagreements will be discussed until consensus is reached. We will present the synthesized findings as descriptive themes with supportive evidence from the included studies. If data permit, we may tabulate findings by subgroups (e.g. by age group or tumour type).

Reporting

The conduct of this review will adhere to PRISMA-P recommendations. The PRISMA flow diagram (Appendix I) will illustrate study identification and selection. We will report characteristics of included studies in a summary table. Where possible, we will follow the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) guidelines for presenting qualitative synthesis.

This protocol has been registered in PROSPERO and will be conducted in line with PRISMA-P (Appendix II) standards. All steps — from search to synthesis — will employ dual-reviewer processes to minimize bias and ensure rigor. Discrepancies at any stage will be resolved by consensus or third-party adjudication. The final report will document any protocol amendments and provide a comprehensive account of our methods in compliance with best practices.

DISCUSSION

Anticipated Findings

Despite improvements in paediatric cancer survival, rehabilitation services remain underused, with limited understanding of their impact on pain and quality of life (QoL) from patient and caregiver perspectives. Quantitative studies demonstrate gains in function and HRQoL with rehabilitation

interventions (17) but they rarely capture the nuanced, subjective experiences critical to tailoring child-centered care. Pain and QoL are multidimensional constructs shaped by emotional, developmental, and social contexts, which are better explored through qualitative research (18).

Strength and Limitations

Existing reviews focus primarily on physical outcomes, overlooking psychosocial dimensions that influence therapy engagement and satisfaction (19). Children's rehabilitation needs vary by diagnosis, treatment stage and cultural background. A qualitative synthesis offers the means to identify shared experiences while respecting contextual variation. It can also illuminate barriers such as limited access, lack of paediatric rehab specialists and caregiver beliefs that quantitative studies often miss (20).

The proposed meta-aggregative approach will systematically compile patient-reported experiences of rehabilitation's role in pain relief and QoL enhancement. Though qualitative studies in this domain are limited and heterogeneous, this method allows for meaningful thematic comparison. Importantly, this will be the first review to synthesize such data, aiming to inform more empathetic and developmentally appropriate rehabilitation strategies in paediatric oncology.

Conclusion and Direction for Dissemination

This qualitative systematic review will provide a comprehensive synthesis of current evidence regarding the impact of physical rehabilitation on pain and quality of life in children with paediatric tumours. By systematically analyzing the perspectives, experiences, and outcomes reported in the literature, the review aims to identify effective interventions, gaps in current knowledge, and potential barriers and facilitators in clinical practice.

The findings are expected to inform healthcare providers, policy-makers, and researchers about evidence-based rehabilitation strategies tailored to paediatric oncology populations. Furthermore, the results will guide the design of future interventional studies and may contribute to the development of clinical guidelines to improve survivorship care and overall quality of life in this vulnerable population.

Dissemination Plan

Academic Dissemination: Presentations at conferences for physiotherapy and cancer , publications in high-impact journals. Creating policies or suggestions for newborn healthcare professionals is known as clinical implementation.

Public and Policy Engagement: Working together with healthcare groups to make sure that results influence policy choices pertaining to neonatal care.

Open Access & Media Outreach: To increase the systematic review's reach, make it publicly

available and use press releases or social media sites.

Acknowledgments

The author expresses gratitude in this part for the critical assistance provided by certain colleagues, institutions, or agencies.

Authors Contributions

Conceptualization: Sharath Hullumani

Data curation: Sharath Hullumani, Rutuja Sawalkar

Funding acquisition: Sharath Hullumani, Irshad Qureshi

Investigation: Sharath Hullumani, Irshad Qureshi,

Methodology: Sharath Hullumani, Irshad Qureshi, Sakshi Desai

Project administration: Sharath Hullumani, Rutuja Sawalkar, Aishik Ghosh

Software: Sharath Hullumani, Rutuja Sawalkar, Shrutika Sharad

Supervision: Sharath Hullumani,

Validation: Sharath Hullumani, Irshad Qureshi

Visualization: Sharath Hullumani, Rutuja Sawalkar, Shrutika Sharad, Aishik Ghosh

Writing – original draft: Rutuja Sawalkar , Sharath Hullumani

Writing – review & editing: Rutuja Sawalkar, Sharath Hullumani

References

1. Lupo PJ, Spector LG. Cancer progress and priorities: Childhood cancer. Cancer Epidemiol Biomarkers Prev. 2020;29(6):1081–1094.
2. GBD 2017 Childhood Cancer Collaborators. The global burden of childhood and adolescent cancer in 2017: an analysis of the Global Burden of Disease Study 2017. Lancet Oncol. 2019;20(9):1211–1225.
3. Tutelman PR, Chambers CT, Stinson JN, et al. Pain in children with cancer: prevalence, characteristics and parent management. Clin J Pain. 2018;34(3):198–206.
4. Robison LL, Hudson MM. Survivors of childhood and adolescent cancer: life-long risks and responsibilities. Nat Rev Cancer. 2014;14(1):61–70.
5. Silver JK, Baima J, Mayer RS. Impairment-driven cancer rehabilitation: an essential component of quality care and survivorship. CA Cancer J Clin. 2013;63(5):295–317.
6. Ospina PA, McNeely ML. A scoping review of physical therapy interventions for childhood cancers. Physiother Can. 2019;71(3):287–296.
7. Rodwin RL, Ma X, Ness KK, Kadan-Lottick NS, Wang R. Physical therapy utilization among hospitalized patients with pediatric acute lymphoblastic leukemia. JCO Oncol Pract. 2022;18:e1060–e1068.
8. Ospina PA, Pritchard L, Eisenstat DD, McNeely ML. Advancing pediatric oncology rehabilitation: survey findings of health professionals' perceptions of barriers to care and a framework for action. Cancers (Basel). 2023;15(3):693.
9. Lockwood C, Munn Z, Porritt K. Qualitative research synthesis: methodological guidance for systematic reviewers utilizing meta-aggregation. Int J Evid Based Healthc. 2015;13(3):179–187.
10. Moher D, Shamseer L, Clarke M, et al.; PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev. 2015;4:1.

11. Joanna Briggs Institute. JBI Manual for Evidence Synthesis. JBI; 2020.
12. Cochrane Review Group. Physical therapy interventions, other than general physical exercise interventions, in children and adolescents before, during and following treatment for childhood cancer. Cochrane Database Syst Rev. 2021.
13. Marchese VG, Chiarello LA, Lange BJ. Strength and functional mobility in children with acute lymphoblastic leukemia. Med Pediatr Oncol. 2003;40(4):230–232.
14. Coombs A, et al. The effect of exercise and motor interventions on physical function in children with cancer: systematic review. Disabil Rehabil. 2020;42(7):xxx–xxx.
15. Tanner LR, Wacker AM, et al. Pediatric oncology rehabilitation: models and program descriptions. Semin Oncol Nurs. 2020;36(1):150984.
16. Wacker AM, et al. Improving functional mobility in children and adolescents undergoing treatment for cancer: program descriptions and evidence. PM R. 2017;9(Suppl 2):S385–S397.
17. Munn Z, Porritt K, Lockwood C, Aromataris E, Pearson A. Establishing confidence in the output of qualitative research synthesis: the ConQual approach. BMC Med Res Methodol. 2014;14:108.
18. Khairnar SS, Hullumani S, Warghat P. *BMJ Case Rep* 2025;**18**:e266707. doi:10.1136/bcr-2025-266707
19. Marchese VG, Chiarello LA, Lange BJ. Effects of physical therapy intervention for children with ALL receiving maintenance chemotherapy: randomized/controlled pilot evidence. Pediatr Phys Ther / Med Pediatr Oncol. 2004.
20. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ. 2021;372:n71.

Supplementary Files

Multimedia Appendixes

Prisma.
URL: http://asset.jmir.pub/assets/54a24cca482d861669a2261eadaf2ee0.png

Checklist.
URL: http://asset.jmir.pub/assets/2f8d8d5ec044d3ef4e6be52c80e78ddd.docx