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School Reintegration After Childhood Cancer Treatment: A Mixed-Methods Study of Re-entry Patterns, Barriers, Facilitators, and Academic Challenges at a Regional Cancer Centre in South India

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Abbreviations table:

Abbreviation	Full term or phrase
LMICs	Low-and middle-income countries
CVI	Content Validity Index
ALL	Acute lymphoblastic leukemia

Abstract

Background: Improved childhood cancer survival has shifted focus to school reintegration; however, evidence on educational outcomes and barriers from low- and middle-income countries remains limited.

Methods: This study aimed to determine the prevalence of school discontinuation after completion of intensive chemotherapy and identify factors associated with school non-rejoining. An explanatory sequential mixed-methods (QUAN→QUAL) study was conducted among caregivers of children (4–18 years) eligible for school re-entry. Quantitative data were collected via a validated questionnaire (September–December 2025), followed by purposive caregiver interviews. Data was analyzed using descriptive statistics and reflexive thematic analysis.

Results: Of 161 children screened, 150 were enrolled [median (IQR) age, 11 (7–15) years; 64% male]. Acute lymphoblastic leukemia (65%) was the commonest diagnosis. Overall, 128 (85%) rejoined school at a median (IQR) 13.5 (10–26) months from diagnosis and 5 (1–16) months post-therapy. Although the child's motivation primarily drove return (91%), 39% experienced re-entry delays (>3 months) due to parental concerns. Most rejoined children (91%) reported absenteeism, largely due to follow-ups or fear of illness. Twenty-two children (15%) did not rejoin school, citing fears of treatment side effects (36%). Male sex ($p=0.018$) and prolonged treatment ($p=0.011$) correlated with non-rejoining. Among returnees, 27% faced academic difficulties, which was also associated with longer treatment duration ($p=0.022$). Caregiver interviews ($n=14$) identified three themes: parental fears, inadequate school support, and a desire for normalcy.

Conclusions: Delayed school re-entry and academic challenges are significant survivorship issues. Prolonged treatment duration increases the risk of both, underscoring the need for early reintegration counseling and coordinated educational support.

Introduction

Improved survival outcomes in pediatric cancers have resulted in a growing population of childhood cancer survivors, shifting the focus of care beyond survival to long-term functional, educational, and psychosocial outcomes (1). Studies suggest that nearly 50% of survivors experience significant school-related problems after rejoining school following completion of cancer therapy (2,3). These difficulties are primarily attributed to physical side effects, chronic fatigue that may persist for over a year and treatment-related neurocognitive deficits that disrupt academic continuity. Beyond clinical challenges, survivors also face important social barriers, including social isolation, peer rejection, and bullying, often related to social stigmas or visible changes in physical appearance (4).

The existing literature on school reintegration issues among pediatric cancer survivors is limited in low-and middle-income countries (LMIC). Although studies from Western countries have highlighted several educational and psychosocial challenges faced by survivors (4,5), there remains a paucity of data from LMICs, including India, where barriers to school reintegration may be multifactorial and context-specific. This study aims to determine the prevalence of school discontinuation among children who have completed intensive chemotherapy and to explore the factors associated with failure to rejoin school after treatment, as well as the impact of cancer treatment on academic performance.

Methodology

The study was conducted in the pediatric oncology outpatient clinic after obtaining approval from the Institutional Ethics Committee (JIP/IEC-OS/2024/269) from September to December 2025. Explanatory sequential mixed method (QUAN->QUAL) research design was employed. Consecutive sampling was used for the quantitative survey, while purposive sampling was employed for the qualitative interviews. Children aged 4–18 years who had completed the intensive phase of cancer treatment and were deemed eligible to rejoin school by the treating pediatric oncologist were included. Children considered unfit to rejoin school due to active disease, receipt of metronomic therapy with palliative intent, or any other significant morbidity precluding school attendance were excluded. Written informed consent was obtained from the caretakers (parent or guardian) of all the children. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Quantitative data were collected using a structured interviewer-administered questionnaire assessing school rejoining status, academic difficulties, school absenteeism, peer interactions,

perceived stigma, and teacher support. The questionnaire was developed by the investigators and underwent content validation using the Content Validity Index (CVI). A panel of eight experts comprising two pediatric oncologists, two oncology social workers, one child psychiatrist, one clinical psychologist, one school teacher, and one patient representative assessed the questionnaire for relevance, clarity, and comprehensiveness (Supplementary Material). Interviews were conducted in the caregivers' native language by a trained clinical research coordinator, and responses were recorded electronically using Google Forms.

Following quantitative analysis, semi-structured qualitative interviews were conducted with selected caregivers representing children who had and had not successfully rejoined school. The interview guide was developed based on the quantitative findings and underwent face validation by experts. Interviews explored barriers and facilitators to school re-entry, parental experiences, and challenges encountered after returning to school. Interviews were audio-recorded, transcribed verbatim, and analysed using inductive thematic analysis. Transcripts were read repeatedly for familiarisation, followed by open coding, development of categories, and generation of overarching themes. Interviews continued until thematic saturation was achieved.

Statistics:

Descriptive statistics were used to summarize baseline characteristics, school re-entry patterns, and academic outcomes. Continuous variables were summarized as median (IQR), while categorical variables were presented as frequencies and percentages. Exploratory analyses were performed to identify factors associated with failure to rejoin school and the presence of academic challenges following school re-entry. Associations between categorical variables were assessed using the Chi-square test or Fisher's exact test, as appropriate. A two-sided p value <0.05 was considered statistically significant. Statistical analyses were performed using IBM SPSS Statistics version 27.

Qualitative analysis: Qualitative data were analysed using Braun and Clarke's six-phase reflexive thematic analysis. Interviews were transcribed verbatim and coded manually by two researchers (JR, psycho-oncologist, and SD, research coordinator). Coding decisions and emerging themes were discussed with a third investigator (PG) to enhance analytical rigour. Reflexivity was maintained throughout the analytical process.

Results

Questionnaire generation and content validation:

The questionnaire was developed following a literature review and comprised sections on demographic and clinical characteristics, along with close-ended questions assessing concerns related to school attendance among children who had and had not rejoined school (2-7). A panel of 8 experts evaluated the 27 questionnaire items for relevance and clarity. Item-level Content Validity Index (I-CVI), Scale-level Content Validity Index (S-CVI), modified kappa statistic, and Content Validity Ratio (CVR) were calculated. Most items demonstrated excellent content validity, with I-CVI values ≥ 0.80 and the majority achieving an I-CVI and CVR of 1.00. The overall S-CVI was 0.94 for relevance and 0.92 for clarity. Based on expert feedback, six items were removed, two were added, and several items were revised to improve clarity and comprehensibility. Following content validation, the revised questionnaire was pilot-tested in six caregivers to assess feasibility, clarity, and comprehensibility. No major modifications were required, and the pilot findings were consistent with the final questionnaire, which was subsequently used for data collection. The final questionnaire used for data collection is provided in the Supplementary Material.

Baseline characteristics

Of the 161 children screened in the outpatient clinic, 150 met the eligibility criteria and were enrolled in the study (Figure 1). The median (IQR) age of the study cohort was 11 (7-15) years. The baseline sociodemographic characteristics of the participants and their parents are presented in Table 1. Approximately two-thirds of the cohort were male (64%). Only 21% of fathers and 29% of mothers had attained a college degree after class 12. Around two-thirds of the families in the cohort resided in rural areas and were classified as belonging to the lower or middle socioeconomic class according to the BG Prasad scale. The educational status of 35% of the cohort was primary school (class I- V) before the start of treatment. Acute lymphoblastic leukemia (ALL) was the most common malignancy, accounting for 65% of cases. With respect to treatment status, 45% of children were receiving oral maintenance therapy, while the remaining 55% had completed treatment. The baseline characteristics are detailed in Table 1.

School-rejoined cohort

Among the study cohort, 128 (85%) children rejoined school. The median time (IQR) to school re-entry was 13.5(10–26) months from the time of diagnosis and 5(1-16) months following completion of treatment. Within the school-attending group, 44% of children rejoined within three months following completion of the intensive therapy, while 39% delayed re-entry by more than 3 months despite being medically eligible due to parental insistence. The re-entry

experience was predominantly positive, with 97% of parents describing the transition as satisfactory. The primary motivation for returning to the classroom was the child's own interest (91%).

In this cohort, 90 (70%) children reported missing school for 1–3 days per month due to hospital visits or scheduled follow-up appointments, while 27 (21%) missed 4–10 days per month because of fear of illness despite the absence of major health issues. Eleven (9%) children reported no significant school absenteeism. Socially, 85% of children's caretakers reported that their interactions remained the same upon return, and the prevalence of discrimination was notably low, with 95% facing no peer discrimination and 100% reporting no discrimination from teachers.

School non-rejoined cohort:

Despite being medically eligible, 22 children (15%) had not returned to school. At the time of assessment, the median (IQR) interval since diagnosis was 20 (16.25–30.5) months, and 12 (8–18.25) months had elapsed since completion of intensive therapy, yet they had still not resumed schooling. The reasons reported by caregivers included fear of treatment-related side effects (8, 36%), school-related restrictions or academic gaps (4, 18%), loss of interest in schooling (3, 14%), and concerns about differential treatment or discrimination (1, 5%). Although these children were not attending school, 10 (45%) were enrolled in private tuition classes. Notably, four of the 22 children expressed no intention of returning to school in the future. All four patients were diagnosed with ALL, completed maintenance therapy and three out of four were above 15 years of age.

Exploratory analysis showed that male sex ($p=0.018$) and a longer duration of therapy ($p=0.011$) were significantly associated with failure to rejoin school after treatment completion. Other factors like age, parental education, place of residence, family income, diagnosis, and treatment status (oral maintenance therapy versus completed therapy) did not have an impact on the successful school re-entry (Table 2).

Academic challenges

Among the school-rejoined cohort, 27% of them mentioned a disparity of marks prior to and post-treatment. The most common reason for disparity was inability to catchup in studies during the treatment period, shown by 97%. The cause for academic challenges was further explored and duration of cancer therapy enduring more than 24 months was found to be

significantly leading to more academic challenges compared to the other groups ($p=0.022$) as detailed in Table 3.

Qualitative findings:

A total of 14 caregivers participated in the semi-structured interviews, including five whose children had not rejoined school and nine whose children had successfully rejoined school. Thematic saturation was achieved after 14 interviews, with no new themes emerging thereafter. Reflexive thematic analysis generated three themes comprising 14 subthemes: (i) barriers to school re-entry (six subthemes), (ii) facilitators of successful school reintegration (five subthemes), and (iii) post-school re-entry challenges (three subthemes) as detailed in Supplementary Figure 1.

The codes and subthemes derived from the transcribed interviews help to contextualize and explain the quantitative findings. The themes, subthemes, illustrative quotes, integration of the qualitative and quantitative findings, and their implications for school reintegration are presented in Table 4.

Discussion

Rejoining school after completion of intensive cancer therapy is a key milestone in survivorship, facilitating a return to normalcy, promoting academic progress, enhancing psychosocial well-being, and improving overall quality of life among children treated for cancer (5). Despite the growing focus on survivorship care, evidence regarding school reintegration remains limited. To the best of our knowledge, this is among the first studies from developing countries evaluating issues related with school re-entry following childhood cancer treatment.

As our centre is a government-funded public-sector tertiary care hospital providing free treatment, the study cohort predominantly comprised children from rural areas and lower- or middle-income families. Given that childhood cancer care in India is delivered predominantly through government-funded tertiary centres offering free or highly subsidised treatment, our cohort is likely to be representative of a substantial proportion of children receiving pediatric cancer care in the country (8).

ALL was the most common diagnosis, and nearly half of the children were receiving maintenance therapy. As maintenance therapy for ALL extends for almost two years, children should be encouraged to rejoin school once they have completed the intensive phase of

treatment and are medically fit. This is particularly important because opportunities for structured learning during the intensive phase of treatment are often limited in our setting. These findings are consistent with those of an Indian study conducted exclusively among children with B-cell ALL, which reported that 25% of the children had not returned to school and were receiving private tuition at home because their parents were unwilling to send them back to school (9).

Among children who returned to school, 39% experienced delay in rejoining despite completing intensive therapy. The delay was significant [13.5(10–26) months from diagnosis and 5(1-16) months from treatment completion] and predominantly due to parental concerns about infections and treatment-related side effects. The qualitative findings provided further insight into these delays, highlighting the impact of physical effects such as fatigue and reduced concentration after treatment on school re-entry. In some cases, parents reported that schools refused to admit children with a history of cancer, resulting in prolonged efforts to identify alternative schools and contributing to parental distress and fatigue. After returning to school, absenteeism remained common (91%), primarily because of scheduled hospital visits, illness, and concerns about infections, as also confirmed by the qualitative interviews. Similar observations have been reported in children with ALL while undergoing maintenance therapy (9). However, the reintegration experience was positive: only 15% of caregivers reported a decline in their child's social interactions, and peer and teacher support was reported to be positive, highlighting a supportive school environment for childhood cancer survivors.

Despite being medically eligible, 15% (22 out of 150) of children had not returned to school at the time of assessment, and 4 of these children had no intention of returning. Qualitative findings provided further insight, identifying lack of trust in school stakeholders. Although nearly half of the non-rejoined children were enrolled in private tuition, this cannot replace formal schooling, which provides not only academic learning but also opportunities for social interaction, physical activity, and confidence building. Failure to return to school may therefore adversely affect long-term educational attainment, psychosocial well-being, and future employment opportunities (10,11,12). Academic challenges were again faced by one-fourth due to difficulty in catching up with studies. Prolonged treatment duration was associated with both school non-rejoining and academic difficulties, highlighting the need for early counselling on school reintegration from the time of diagnosis, particularly for children expected to undergo prolonged therapy like ALL. Male sex was also associated with school non-rejoining; however, this finding should be interpreted cautiously as it may reflect the male predominance in our

cohort rather than a true sex-specific barrier. Larger studies are needed to validate this association.

The qualitative findings complemented our quantitative results by showing that most parents considered education and their child's independence to be as important as survival and that school rejoining is the first step in making the child feel and be independent. Although fear of relapse, infections, and treatment-related complications remained prominent, many parents expressed a strong desire for their children to return to school and regain a sense of normalcy. The dual role of school stakeholder support as both a barrier and a facilitator highlights the need for greater engagement of schools in the reintegration process. Parents also emphasized the importance of early psychoeducation and continuous reassurance from healthcare professionals, beginning at diagnosis and extending throughout survivorship.

The Association of Pediatric Hematology Oncology Educational Specialists and International Society of Paediatric Oncology recommend that educational support for children with cancer should begin at the time of diagnosis and continue throughout treatment (13,14). In LMICs, however, the immediate priorities at diagnosis are often treatment initiation and supportive care, with educational needs of the children receiving little attention. Resource-intensive models such as hospital-based schools, homebound instruction, and videoconferencing-based education, which are well established in high-income countries, are currently not feasible in most Indian settings. Nevertheless, early communication and collaboration among healthcare providers, families, and schools are achievable and should be integrated into routine care from the time of diagnosis. Simple interventions such as home-based tuition or virtual educational support during intensive therapy, followed by timely school re-entry once the child is medically fit, may help minimize educational disruption. Maintaining contact with teachers and peers throughout treatment may further facilitate successful school reintegration and improve the child's psychosocial well-being.

The strengths of this study include its mixed-methods design and the comprehensive evaluation of school reintegration following childhood cancer treatment. However, the study is limited by its single-centre nature and convenience sampling, which may limit the wider applicability of the findings.

Delayed school re-entry and failure to return to school despite medical eligibility remain important challenges, with many children also experiencing academic difficulties after reintegration. Nevertheless, most survivors and their families expressed a strong desire to

resume schooling and regain normalcy. Early counselling regarding school reintegration, together with coordinated support from healthcare professionals, families, and schools, is essential to facilitate timely school re-entry, minimize educational disruption, and improve long-term educational outcomes.

Author Contribution(s): SK conceived the study and, together with HS, developed the study design. SDS, HS, and RS validated and administered the questionnaire. HS and SDS collected the quantitative data, while JR and SDS conducted the qualitative interviews. SK, HS, and SDS performed the statistical analysis. HS and JR drafted the initial manuscript. PG, VVS, USCR, SmK, and BD contributed to the clinical care of the children with cancer and critically reviewed the manuscript. All authors critically revised the manuscript and approved the final version of the manuscript.

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Conflict of interest: The authors have no conflicts of interest to disclose.

Data availability: Data supporting the findings of this study are available upon reasonable request.

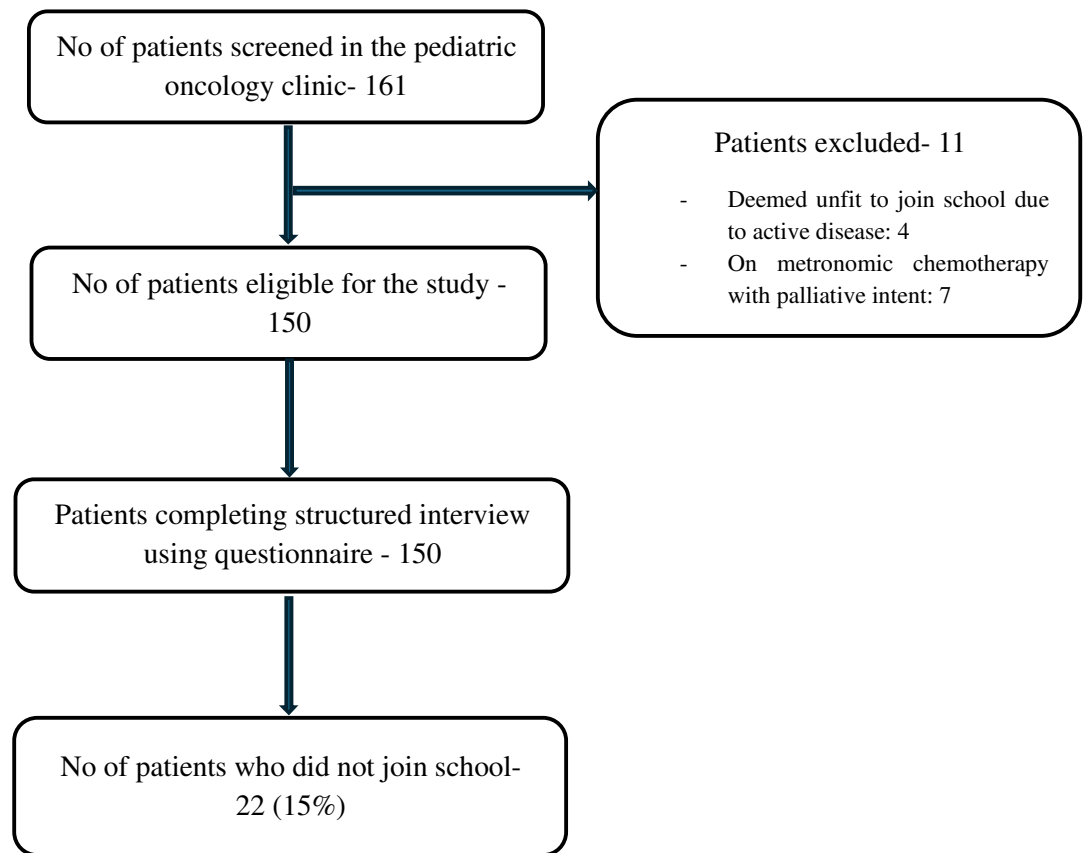
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Figure 1: Flow diagram of participant screening and inclusion in the quantitative study.



Supplementary Files

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