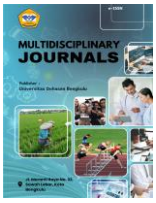

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Play Therapy As A Method Of Fine Motor Stimulation For Hospitalised Children With Acute Lymphoblastic Leukemia

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Abstract. *Children with Acute Lymphoblastic Leukaemia (LLA) are at risk of developmental delays due to the effects of long-term therapy and repeated hospitalisations. This study aims to describe the application of fine motor development stimulation through play therapy, based on the family-centred care approach, for children with LLA who experience developmental delays. Methods: This study used a case study design on a 2-year-old hospitalized at RSUD Welas Asih. Denver II results indicated a delay in fine motor development because he was unable to grasp a pencil or scribble on paper. The intervention lasted 4 days and included family education, pencil-grasping exercises, scribbling activities, and the introduction of simple puzzles. The result showed an improvement in fine motor coordination, with a score increase from 7 to 8. Active family involvement during therapy enhanced the child's motivation and supported the continuity of stimulation at home. This simple intervention proved effective in supporting the fine motor development of children with chronic diseases and aligned with principles of pediatric palliative care, which focus on improving the quality of life of children and families. Ongoing stimulation and continued use of puzzle activities at home are recommended to further strengthen hand coordination and concentration skills.*

Keywords: *Play Therapy, Fine Motor*, *Acute Lymphoblastic Leukemia*, *Pediatric Palliative Care, Family-Centred Care.*

INTRODUCTION

Cancer in children has become a national priority with a rate of 3-5%, because it is highly curable. This is possible with access to diagnostics, adequate therapy, and adequate support services. Based on the total number of childhood cancer cases, Acute Lymphoblastic Leukemia (ALL) is one of the most common, with 2,963 cases in 2020-2022 (Kementerian Kesehatan Republik Indonesia, 2024). Before an official diagnosis, symptoms such as bleeding from mucosal or skin surfaces, petechiae (Widiaskara et al., 2016), paleness, fever, and weakness often appear (Tarigan et al., 2019). Like other diseases, cancer in children can also have a negative impact on children, such as on their growth and development. Chemotherapy is performed to control the spread of cancer cells in the body (Pangestu, 2025), but this treatment can also cause side effects such as decreased physical condition, changes in nutritional status with nausea, vomiting, decreased appetite, diarrhea, fatigue, and fever (Fatikasari et al., 2018; Herfiana & Arifah, 2019; Wolley et al., 2024), psychological stress, neurocognitive disorders, and decreased hand dexterity and visual-motor coordination (Goebel et al., 2019; Semendric et al., 2025; Velasco-Hidalgo et al., 2024).

Side effects do not always appear immediately after treatment. It has been reported that the prevalence of neuromuscular dysfunction can reach 14.7% five years after diagnosis,

indicating that the impact on fine motor skills is a long-term consequence (Rodwin et al, 2021). In ALL patients, the use of vincristine (VCR) also carries a risk of polyneuropathy, which leads to decreased peripheral muscle strength and thereby impacts the child's fine motor skills (Tremolada et al., 2019). These side effects can reduce the child's ability to participate in play activities and explore their environment. In the future, developmental barriers can persist into adolescence or young adulthood if not addressed or provided with early developmental stimulation (Deviaterikova, 2025; Egset et al., 2021). Thus, disorders in growth and development can affect the quality of life of children with cancer (Hanaratri, 2024; Nurhidayah et al., 2016).

Stimulation can mitigate the adverse effects of cancer and chemotherapy on child development (Siswanto et al., 2023). Regular stimulation of growth and development can accelerate growth and development in children aged 1-3 years with cancer (Kustiani et al., 2025). Children with cancer not only require a focus on biological aspects but also need palliative care as part of a comprehensive approach. Effective palliative care requires the involvement of the family as key partners in the decision-making process and implementation of care, often referred to as family-centred care (International Children's Palliative Care Network, 2022; O'Connor et al., 2019; World Health Organization, 2023). Palliative care can reduce pain and emotional stress, strengthen family support in navigating the treatment process, and improve social interaction, even in chronic conditions (Rahmah, 2022). The integration of palliative care and child development stimulation is an important component in supporting the quality of life of children with Acute Lymphoblastic Leukemia (ALL). Developmental stimulation, particularly in the aspect of fine motor skills, plays a role in maximizing children's adaptive functions and ability to interact with their environment, while the family-centered care approach ensures active family involvement in the care process. However, in practice, developmental aspects are often not the focus of care for children with chronic illnesses because the attention of families and health workers is more centered on medical treatment. Therefore, this case study will describe the application of family-centered care-based fine motor stimulation intervention as part of a palliative nursing approach with the aim of strengthening the role of nurses in improving children's quality of life holistically, including physical, psychosocial, and developmental aspects.

LITERATURE REVIEW

Cancer is a leading cause of death from non-communicable diseases, continues to increase globally and is estimated to reach 35 million cases by 2050. Of the various types of cancer, the government is focusing on five types, one of which is cancer in children (Kementerian Kesehatan RI, 2024). Cancer in children can have a wide range of negative effects, especially on their growth and development. This can occur due to the effects of chemotherapy, which causes irritation to the stomach and duodenum mucosa and stimulates the vomiting center in the central nervous system. In addition, chemotherapy drugs can cause nausea and vomiting, which reduces children's appetite and leads to malnutrition and growth disorders (Herfiana & Arifah, 2019).

Child growth and development can be influenced by various psychosocial factors, including stimulation, learning motivation, and peer groups. Stimulation is a continuous form of training that sharpens a child's development and can be provided by those closest to the child (Nurhayati & Susilowati, 2020). Stimulation also acts as a non-pharmacological therapeutic modality that can reduce stress, increase comfort during hospitalization, and support emotional regulation. The literature shows that childhood cancer survivors who receive early-stage stimulation or developmental rehabilitation interventions have better cognitive, motor, and learning abilities than those who do not (Deviaterikova, 2025; Egset et al., 2021).

The growth and development of children during their first five years is a golden period, when it is the right time to optimise their development (Pratama, 2017). Stimulation begins with educating parents or other caregivers. The success of stimulation is largely determined by the approach and by the emotional and social support in the environment. Family involvement is a manifestation of the application of the principle of family-centered care to create a supportive environment that can reduce the emotional and psychological burden caused by illness (Hashim et al., 2024). Providing education to parents aims to increase their knowledge, thereby providing additional support for caring for children and serving as the initial foundation for children's education (Pratama, 2017). Education is delivered through interactive discussions on aspects of child development by age, signs of delay, and how to perform simple home stimulation. Stimulation must be preceded by sufficient knowledge, as it reflects concern for the child's development (Pratama, 2017).

Delayed child development, such as fine motor skills, can result from a lack of stimulation and treatment, leading to abilities that do not develop in line with the child's age. Play is considered an effective way to stimulate children's fine motor skills. Research also shows improvements in children's abilities after play therapy, both at home and at school. Thus, playing is not only a form of entertainment but also an effective means of stimulating children's physical and mental development (Imaniya et al., 2024). Play activities carried out to support children's fine motor development include eye-hand coordination exercises and finger muscle strength training (Hartimang et al., 2024; Wigati et al., 2022). These activities can be carried out in a care environment without specialised equipment and can help explore children's creativity, even when they are in the hospital undergoing treatment.

METHODS

The intervention was conducted at the CA Center of RSUD Welas Asih on September 16-20, 2025. The subject of the intervention was An. A, a 2-year-old boy diagnosed with high-risk acute lymphoblastic leukemia (ALL). Data collection began with a comprehensive assessment of the child's condition, including physical aspects, development, observation of the child's play activities, interaction skills, and responses to objects around him. In addition, interviews were conducted with the parents to obtain information about the child's growth and development history, play habits, and stimulation provided at home. The child's development was measured using the Developmental Screening Questionnaire (KPSP) in the Denver II Developmental Screening Test (DDST), with results categorised as normal, suspect, or unstable.

The subject is a 2-year-old boy diagnosed with High-Risk Acute Lymphoblastic Leukemia (ALL) in July 2025. The patient is being treated for his sixth cycle of chemotherapy. Since undergoing chemotherapy, his eating frequency has remained the same, but his portion size has decreased to about half of what it used to be. Elimination is within normal limits, with increased urinary frequency during chemotherapy. Physical examination shows the patient appears pale, in poor nutritional status, and below average for his age, with dry lips and decreased activity. Functional status was assessed using the Karnofsky Performance Status (KPS) 50 and ECOG 1, indicating that the patient is still able to perform light activities but requires assistance for most daily activities. Based on the Pediatric Palliative Assessment Scale, An. A is in the early palliative phase, which is the initial stage of acceptance and planning for palliative care.

In terms of growth and development, the results of the Developmental Screening Questionnaire (KPSP) were questionable (suspect), with a score of 7 out of 10 questions. In terms of fine motor skills, the child was unable to hold a pencil correctly and perform simple activities, such as scribbling on paper. This finding indicates that the coordination between the eyes and hands, as well as the strength of the fingers and wrist muscles, has not developed optimally. Gross motor development is generally good and age-appropriate, though further

stimulation is needed to further develop motor skills. The child can point to two body parts, most often the hands and feet, and can combine two words or objects in everyday communication. Lastly, in terms of socialisation and independence, the child is able to interact with their surroundings, respond to invitations to play, and begin to exhibit simple independent behaviours, such as taking off their own jacket. The results of this assessment show that, among the four developmental aspects, fine motor skills are the most delayed, while the others are relatively age-appropriate.

The intervention was provided through fine-motor development stimulation in play therapy. Play therapy can be performed on children with leukemia but must be adjusted to the child's health condition (Ramdaniati et al., 2023). The activities provided included pencil grip exercises, scribbling on paper, and trying simple puzzle games. The selection of activities was based on the child's initial abilities and the time constraints of the intervention, which took place during hospitalization. The intervention was carried out daily during the treatment period with the timing adjusted to the child's condition.

RESULTS

Nursing intervention began with educating the parents. Education included the objectives of stimulation, fine motor stimulation techniques appropriate to the stage of development, and the importance of family support in the play therapy process. After the education, parents were given the opportunity to discuss their child's developmental condition. The mother responded positively and said that so far she had only focused on chemotherapy, saying, “I have only focused on my child's chemotherapy. Since he got sick, he has not been given any games to play, so apart from sleeping, he only watches cartoons on my cell phone.” This statement shows that developmental stimulation had not been a concern for the family during the child's treatment process. After the education session, the mother began to understand the urgency of fine motor stimulation and committed to actively participating in and continuing the exercises upon the child's return home from the hospital. In all subsequent intervention sessions, the mother was consistently involved by accompanying the child, introducing play tools, and providing positive encouragement.

The fine motor development stimulation intervention was conducted for 4 days, twice a day, while the child was in the hospital for treatment. The intervention was given when the child was not resting or eating, and responded well when communicated with. On the first day, the child was unable to hold a pencil and showed no interest in activities involving hand coordination. The child's finger movements were still stiff and required assistance. The author and the child's mother helped the child when he was confused about how to hold a pencil, and stopped the stimulation when he refused and wanted to rest again. On the second day, although there were no significant changes in motor skills, the child began to show initiative to hold a pencil without being asked. The child appeared more responsive to invitations to play. Although hand coordination remained unsteady, the child's initiative during play indicated an increase in motivation to participate in stimulation activities.

On the third day, the child's response became more stable. The child began to spontaneously scribble on paper after being given a pencil. The scribbles were still simple and irregular, but were done without physical assistance. At this stage, the child seemed more comfortable with writing instruments and showed greater natural interest in play activities, despite no significant technical progress in fine motor skills. On the fourth day, the child showed consistent initiative. An. A began to hold the pencil more functionally and immediately scribbled on paper when given writing instruments, without the need for intensive verbal stimulation. The duration of his involvement in the activity also increased, as shown by his greater interest in paper and pencils. Although the improvement in fine motor skills was still at a basic level, this

development indicated good adaptation to repeated stimulation and an increasingly strong readiness to learn.

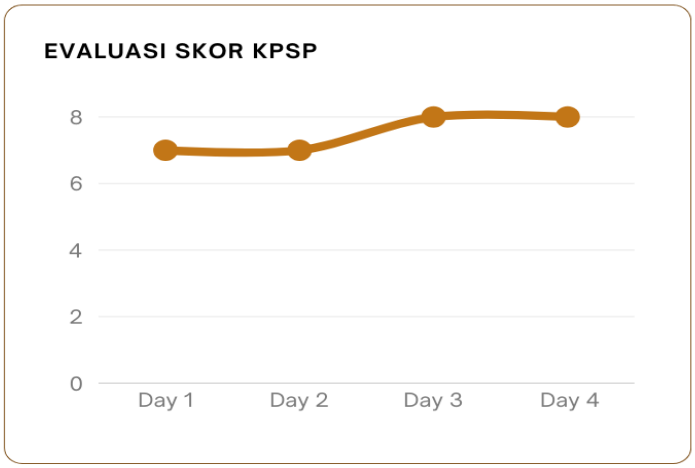

Figure 1. Graph of Child Development Evaluation per Day After Intervention

Based on the author's observations, the evaluation results were recorded in the KPSP score calculation every day after the intervention. Figure 1 shows the results of the intervention evaluation conducted on the child. The changes experienced by the child indicate improved eye-hand coordination and fine motor skills, as evidenced by an increase in the fine motor skills aspect, resulting in a total score increase from 7 to 8. This indicates positive development in fine motor skills.

DISCUSSION

Childhood is a crucial period for growth and development, during which rapid acquisition of basic adaptation skills and dynamic growth significantly impact social and academic learning. During this phase, children need to develop motor skills, such as catching objects, drawing, and holding a pencil. However, children with cancer often experience developmental delays due to the disease process, treatment side effects, and limited activity during hospitalization (Kustiani et al., 2025; Tremolada et al., 2019). The subject is a 2-year-old boy, who is in the age group most commonly affected by Acute Lymphoblastic Leukemia, with most cases occurring in children under 10 years of age (Anggreini & Supit, 2022; Fatikasari et al., 2018), and the majority are male (Alvionita & Arifah, 2021; Herfiana & Arifah, 2019; Novrianda et al., 2016).

In the context of palliative care, family support, especially informative support, is a key factor in the successful care of children with cancer (Fatmiwiryastini et al., 2021). Informative support is provided through brief educational sessions for families. This education aims to increase families' understanding that attention to children should not only focus on treating chronic diseases but also on their development.

Fine motor skills include the child's ability to perform activities that require coordination between the eyes and hands, such as picking up toys, using writing instruments, grasping, drawing, arranging, and assembling puzzles (Hanaratri, 2024). At the beginning of the intervention, An. A was given writing instruments in the form of colored pencils and paper. The author demonstrated how to hold a pencil, then slowly guided the child's hand into the correct grip. The mother also provided positive support, making the play atmosphere fun and increasing the child's interest in participating. In addition, he was given a simple puzzle containing 2-3 pieces as recommended for the 18-24 age group (Kementerian Kesehatan RI, 2022).

Stimulation was repeated throughout the treatment period. After several days of intervention, An. A showed an improvement in her ability to hold a pencil and was able to scribble on paper independently. This change demonstrates that simple, consistent stimulation can improve fine motor skills, as described by Kustiani et al. (2025). The involvement of mothers as companions in each session also strengthened the children's positive responses to play activities and enabled the stimulation to continue independently at home, thereby supporting children's exploration as a basic need (Nurhayati & Susilowati, 2020).

Several obstacles were encountered during the intervention. First, the children's attention was easily distracted, especially in the first two days, due to activities outside their usual routine, namely writing activities. Second, the physical condition of children undergoing chemotherapy resulted in a shorter focus duration (approximately 10-15 minutes), so the intervention had to be adjusted to the children's comfort level. Third, the children showed no interest in puzzles. This may be because puzzle-solving requires more complex coordination, longer attention spans, and problem-solving skills, while children with ALL tend to experience decreased focus (Tremolada et al., 2019).

Developmental disorders in children with cancer often persist into school age if not treated early. Research by Goebel et al. (2018) indicates that 3.5 years after therapy, ALL survivors still show a decline in fine motor skills, including drawing and writing. Other studies indicate that visual-motor and cognitive impairments can impact academic performance, attention, executive control, and long-term learning (Deviaterikova, 2025; Goebel et al., 2019). Even in patients who only underwent chemotherapy without radiation, the risk of neurocognitive deficits remained high, including memory impairment and slowed processing speed (van der Plas et al., 2021; Mavrea et al., 2021). Egset et al. (2021) emphasised that these deficits can persist into adulthood, underscoring the need for continuous stimulation and rehabilitative support.

Developmental stimulation plays a crucial role in improving the quality of life for children with cancer. Nurses play a role in helping children maintain physical function and independence according to their capacity, in line with the principles of palliative care, which focuses not only on symptom control but also on improving quality of life. Consistent stimulation can help children and parents feel a sense of normalcy, namely that they can still grow and learn like other children their age. This is important for supporting the child's psychological well-being and strengthening the emotional bond between the child and their family. Thus, interventions such as fine motor stimulation through play therapy and family education not only support physical development but also form part of a holistic palliative care approach aimed at improving the child's quality of life.

CONCLUSION

This case study aims to describe the application of fine motor development stimulation through family-centered care-based play therapy in children with Acute Lymphoblastic Leukemia (ALL) who experience developmental delays. The assessment results show that An. A has difficulties with fine motor skills. After receiving an intervention in the form of pencil-grasping and scribbling activities on paper for four days of treatment, An. A showed improved eye-hand coordination and finger muscle strength, as indicated by an increase in the KPSP score from 7 to 8. Puzzle activities could not be performed during treatment and were recommended as a home follow-up stimulation activity.

Active family involvement in each therapy session contributed to the intervention's success, increased the child's motivation, and strengthened the emotional bond between the child and parents. Overall, simple, repeated, and enjoyable stimulation interventions have been proven effective in supporting the motor development of children with chronic conditions. The family-centred care approach is key to success because it encourages continued stimulation at home. Therefore, it is necessary to integrate developmental stimulation activities into pediatric

nursing care in hospitals, especially for patients with chronic illnesses, to improve children's quality of life holistically in accordance with the principles of pediatric palliative care.

LIMITATION

This study employed a single-case design, which limits the generalizability of the findings to the broader population of children with Acute Lymphoblastic Leukemia (ALL). The relatively short duration of the intervention, conducted over four days during hospitalisation, limits the evaluation of its long-term effects. In addition, the child's physical condition during chemotherapy, including fatigue and reduced concentration, influenced the consistency and intensity of the intervention delivery.

Furthermore, developmental assessment relied on the *Kuesioner Pra Skrining Perkembangan* (KPSP), a screening tool with limited sensitivity for detecting subtle changes in fine motor skills. Environmental constraints within the hospital setting and limited variation in play materials may also have affected the implementation of play-based therapy. Future studies are recommended to involve larger sample sizes, longer intervention periods, and more comprehensive developmental assessment instruments to strengthen the evidence base.

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