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RESEARCH ARTICLE

Functional status in children with leukemia after chemotherapy: A survey based analysis in Lahore

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ABSTRACT

Background: Leukemia is a disease occurring due to a defective hematopoietic tissue that endangers the health and life of children. Children with leukemia have a decreased functional status. However, there is no literature examining the functional status of children with leukemia after their treatment.

Objective: The objective of this study was to assess the functional status of children with leukemia after chemotherapy.

Methods: This was a descriptive cross-sectional study conducted on 89 patients. The ethical approval was obtained having reference number LCPT/DPT/4566. Data was collected from Children's Hospital, INMOL Cancer Hospital, Lahore General Hospital and Jinnah Hospital. The duration of the study was six months. The sampling technique used was non-probability Convenient Sampling. The Lansky Play-Performance scale was used to assess the functional status of leukemia in children. Newly diagnosed patients aged between 4 to 15 years were included in the study. Data was analyzed using SPSS version 21. Variables were presented in the form of percentages and frequencies.

Results: The results showed that out of 89 patients, majority of patients i.e. 46.1% (n=41) were found to be severely restricted, 41.5% (n=37) were found to face mild to moderate activity restriction n=41, 12.4% (n=11) were able to carry on normal activity, and no special care was needed.

Conclusion: The study concluded that majority of children with leukemia after receiving sessions of chemotherapy were moderately to severely restricted in performing their daily life activities.

Keywords: Chemotherapy, Childhood, Functional status, Leukemia

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Introduction:

Leukemia refers to a disease in which a defective hematopoietic tissue endangers the health and life of children. It usually affects the leukocytes or white blood cells.(1) Leukemia is the most common cancer among children(2) with two leading subtypes, i.e., Acute Lymphoblastic Leukemia (ALL) and Acute Myeloid Leukemia (AML). A small proportion may also report symptoms of Chronic Myeloid Leukemia (CML) and Juvenile Myelomonocytic Leukemia (JMML).(3) Leukemia encompasses 25% of all childhood cancers and has a high rate of malignancy.(4) The most prevalent Leukemia is Acute Lymphoblastic Leukemia, i.e., 80%. (5) In the US, some epidemiological studies identified numerous pre and post-natal risk factors that are pesticides, tobacco smoke, and alcohol(6), exposure to certain chemicals, air pollution, and disclosure to certain types of paints, and petroleum goods during pregnancy. (7) Each year, more than 30 new cases per million of age 3-5 years are diagnosed in the United States.(8)

Leukemia is known to affect an individual's Functional Status. Functional status refers to the ability of a person to execute the activities of daily life (ADLS) and functions that require physical needs in the state of illness.(9) Functional status is also known as the ability to perform leisure activities, ADLS, and to interact with the environment using the musculoskeletal system.(10) Chemotherapy is the main treatment used to treat childhood Leukemia.(11) Pyrexia, shortness of breath, weight gain, cardiovascular issues, and renal failure are commonly reported and observed toxic effects of chemotherapy.(12) Risks can be reduced by providing supportive care and through providing

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certain modifications to therapy. Persistent long-term follow-up of children who had Leukemia in childhood is necessary to define the risks and to develop strategies to decrease risks, ameliorate toxic effects, or both.(8)

The level of association between functional status and childhood Leukemia after chemotherapy is important because this directly affects patients' daily living and can lead to a worsened survival rate. In Leukemia, functional status in patients within the treatment phase, irrespective of the type of treatment they receive, or those who have completed their treatment are lower than healthy children.(13) The activity level throughout treatment sessions is significantly reduced in patients of pediatric cancer.(14,15)

In Leukemia, majority patients experience reduction in their physical activities. So, early regular physical activities during treatment or after treatment can help the cancer patients to minimize the side effects of the treatment and can also improve their functional status and social reintegration.

Methods:

A descriptive cross-sectional study under the ethical approval letter number LCPT/DPT/4566 was conducted on 89 Leukemia children who had undergone Chemotherapy. The sample size was calculated using World Health Organization (WHO) software with 0.25% prevalence (P)(4), 95% confidence interval (1-α), and 0.09 precision (d). The study settings were Children's Hospital**,** INMOL Cancer Hospital, Lahore General Hospital and Jinnah Hospital.

The sampling strategy utilized was nonprobability convenient sampling. The duration of the study was from June 2020 to December 2021 (6 months). Children diagnosed with Acute Lymphoblastic Leukemia, Acute Myeloid Leukemia, Chronic Myeloid Leukemia, and Juvenile Myelomonocytic Leukemia at the age of 4-15 years were included. Chronic Lymphocytic Leukemia patients, non-cooperative subjects, and parents and children who were also suffering from any other disorders and medical regimens were excluded. Patients were assessed using the Lansky Play-Performance Scale.

The validity of the Lansky Play-Performance Scale is 0.74.(16) A prior consent of all the patients was taken. Data was entered by using Statistical Package for Social Sciences (SPSS) version 21 and the same software was used for data analysis.

Results:

The age of the patients was between 4 to 15 years with mean age of 8.69 years ± S.D 4.60. Out of 89 children, 48.3% (n=43) were males and 51.7% (n=46) were females.

Amongst 89 patients, majority of patients, i.e., 46.1% (n=41) were found to be moderately to severely limited, while 41.5% (n=37) were found to be mild to moderately restricted. Only 12.4% (n=11) were able to carry on their normal activity, and no special care was needed.

According to the results shown in Figure 1, 12.36% (n=11) of children were able to carry on their normal activity, no special care was needed. 41.57% (n=37) were found to be mild to moderately restricted in their activities and 46.07% (n=41) were moderately to severely restricted.

Table 1 shows frequency of each activity in the Lansky Play-performance scale.

Table 1: Lansky Play-Performance scale

Description	Frequency (Percent)
Does not play nor get out of bed	6 (6.7%)
Often sleeping, play is entirely limited to very passive activities	11 (12.4%)
Stuck in bed, needs help even for quiet play	13 (14.6%)
Mostly in bed, participates in quiet activities	12 (13.5%)
Lying around much of the day, but gets dressed ,no active play, participates in all quiet play and activities	12 (13.5%)
Up and around, but minimal active play, keeps busy with quieter activities	10 (11.2%)
Both greater restriction of, and less time spent in, active play	16 (18.0%)
Active but get tired more easily	8 (9.0%)
Minor restrictions with strenuous physical activity	1 (1.1%)

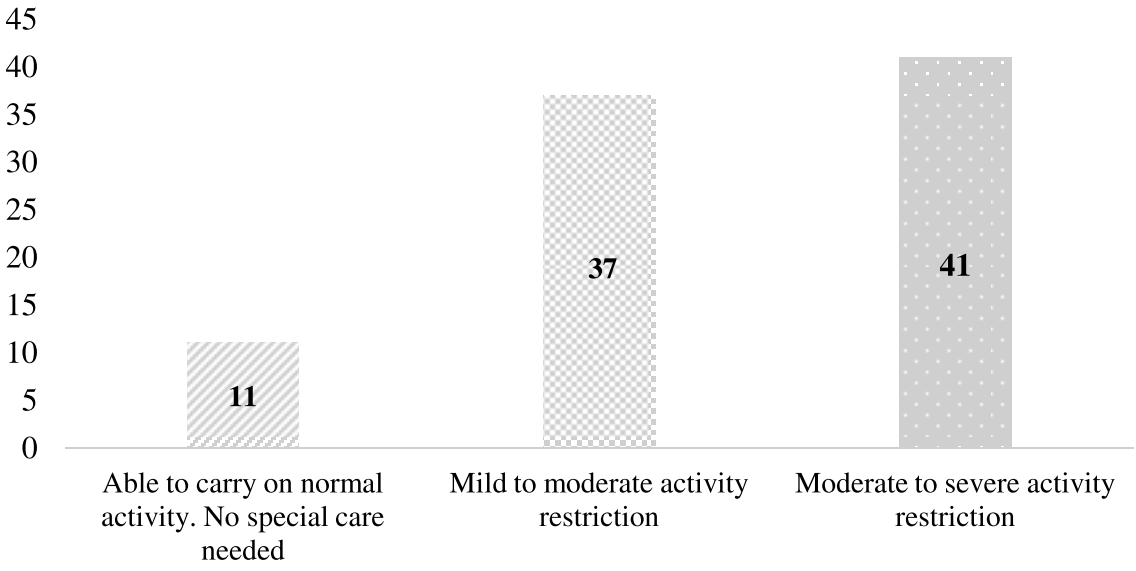

Figure 1: Activity restriction distribution

Discussion:

The present study was an attempt to assess the functional status among childhood Leukemia post-chemotherapy in Lahore by using Lansky Play-Performance Scale in children under the age of 4 to 15 years. Previous studies also present evidences through their researches about chemotherapy and its impact on functional status such as they found that children with Leukemia were notably weaker with reduced functional status and quality of life when compared with their healthy age fellows, along with increased threat of poor psychological health.(16) The results of current study report the same and show consistent findings in that the functional status of majority of patients deteriorated after Chemotherapy sessions.

In 2020, a study was conducted and it reported poor quality of sleep due to poor quality of life and long term side effects of treatment and pain, and due to this, it directly correlated with poor psychological outcomes. They also reported that children having long term treatment have many negative impacts on them, and sleep is one of them. The proximity of serious, disabling, and chronic health conditions increases the probability of impairments beyond all health domains, with te significant effect on functional impairment and activity limitations.(17) Current study also demonstrated that there were remarkable activity limitations or reduced functional status among young Leukemia patients post-chemotherapy and 46.07% of sample size patients were on the level of moderate to severe activity restriction. The chronic health concerns of children and their parents ultimately resulted in collapsed daily life and its activities.

A study was conducted in 2018 by Chang Hyun et.al, concluding that patients who have better performance scale exhibit greater compliance rate and have longer survival rate and satisfaction. As the disease progresses or approaches the terminal stage, performance diminishes and the rate of survival also lessens.(18) The present study also reports identical findings. Those who have poor performance status and are close to terminal stage, their survival rate was also found to be decreased.

In 2018, another study was conducted, and they reported activity limitation and participation restriction among childhood ALL survivor and showed higher prevalence of poor functional status, and that these children have increased risk of functional impairment. (19) A study published in 2020 showed that due to induction phase in Chemotherapy, drug induced therapy, a reduction in general mobility, health issues and constipation was evident.(20)

In 2021, another study conducted about cancer survivors showed that majority patients had respiratory issues, while others had long term compromised lung functions.(21) A cohort study was conducted and it revealed psychological issues related to reduced functional status. It assessed the effect of functional status on psychological risk factors. The results of this study revealed that patients who underwent chronic and long term treatment had mood swings, depression, anxiety, fatigue, discomfort and other mental health issues and it clearly showed that reduced activity and poor functional status reflects negative mood and

psychological issues.(22) In the current study, it was noted that patients were less active and anxious after suffering from long term therapy, and were spending their time mostly resting and on bed.

In 2018, long term effects were studied in childhood Leukemia survivors after stem cell transplantation, and it was noted that they were exposed to severe health impairments which ultimately affected their quality of life.(23) In the present study, long term treatment showed reduced activities, poor quality of life and functional status.

In 2019, a study was conducted in which they measured fatigue, obesity and mobility of patients in cancer survivor children. A higher level of depression and fatigue was seen among cancer survivals due to reduced activity and poor participation in any physical activity. Fatigue is the most common risk factor due to chronic term treatment.(24) The present studies shows that patients were less active and can overcome this if parents support them as it can uplift their functional status. Further, more interventions can be planned in future which directly engage parents. Proper guidelines should be imparted and educating parents regarding their child health is very important. The main barrier in this study was misconception regarding physical activity of children, which may cause fatigue and ultimately harm children. Furthermore, family support is the foremost enabler of involving children in regular physical activity amongst pediatric survivals of cancer.(25)

In 2021, physical and cardiovascular risk factors were assessed in cancer survivals. Physical fitness is one of the strongest protective health measures for cardiovascular diseases and cancer. Promoting healthy lifestyle can overall reduce the other comorbidities and decrease the chances of cardiovascular issues and improve survival chances. They found out that survivors with better physical activity were on reduced risk of cardiovascular diseases.(26)

Conclusion:

The findings of the study suggested that majority of children with Leukemia experience moderate to severe activity restriction. Future studies are recommended to assess functional status, before and after Chemotherapy.

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Batool A: Data collection
Hamid K: Data collection
Atta S: Writing article, Data analysis, Final guarantor till approval
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