O&G Forum 2024; 34 – 3s: 1321-1329

# ASSOCIATION BETWEEN FOOD FREQUENCY INTAKE AND DAILY LIVING ACTIVITIES AMONG CHILDREN WITH LEUKEMIA

**Jaber Qasim Jaber[1], Abdul Mahdi A. Hasan[2], Ameera Jasim Al-Aaraji[3]**

[1]Doctorate student Child Health nursing, Faculty of Nursing, University of Babylon: jaberqasim@g.alzahu.edu.iq jaber.jaber.nurh99@student.uobabylon.edu.iq
[2]Experienced professor of Child Health nursing, Faculty of Nursing, University of Babylon: abd_mahdi2003@yahoo.com
[3]Assistant Professor of Clinical biochemistry, Faculty of Nursing, University of Babylon: nur.ameera.jasim@uobabylon.edu.iq

**Abstract**

Objectives: To Assess the Food Frequency Intake and the Daily Living Activities Regarding Children with Leukemia. To find out the association between Food Frequency Intake and Daily Living Activities Regarding Children with Leukemia. To find out the association between Food Frequency Intake and Daily Living Activity Regarding Leukemic Children with their socio-demographic characteristic.

Methodology: A "Descriptive (Cross sectional) study" was conducted in three hospitals Holy Karbala Health Department, Karbala Children's Teaching Hospital and Imam Hassan Al-Mujtaba Teaching Hospital on children with Leukemia in Holy Karbala City between the period of ( 22 June 2022 ) to (26 January 2024) .

Results: The study revealed a significant positive correlation between the Food Frequency Intake of children with leukemia and their daily living activities. Conclusion: Conclusion: Children with leukemia are affected by the treatments used, such as chemotherapy or radiation, and this in turn affects the children's loss of appetite, and thus they eat meals of average quality and small quantity. Which negatively affects children's daily life activities. Recommendations: Recommendations: Parents of children must be educated on the negative effects that result from malnutrition and its impact on the time and rate of their recovery from the disease, and focus on improving dietary habits, their diversity and the number of main meals the child eats to provide him with energy and growth, and encourage sick children to rely on themselves for their special needs. Providing detailed scientific information about the disease in an appropriate way to explain it to the children's parents.

Keywords: Food Frequency Intake, Daily Living Activities, Children, Leukemia.

## Introduction

In pediatric diagnosed with cancer, suboptimal nutritional status is a common consequence of the disease and its treatment. These nutritional conditions are associated with increased morbidity and mortality and have been linked to a variety of aetiologies, depending on the type and treatment of cancer and the individual patient. The treatment approach encompasses pharmacotherapy, psychosocial interventions, and surgical management (Bray et al., 2018).

Three sets of DNA have undergone mutations as part of the genetic modifications. The initial category consists of proto-oncogenes, which generate protein products that inhibit normal cell demise or promote cell division. The genes that have undergone mutations are referred to as oncogenes (Croce, 2018).

The third category comprises DNA repair genes, which aid in averting the occurrence of cancer-causing mutations. The second category comprises tumour suppressors, which produce proteins that ordinarily inhibit cell division or induce cell death (American Cancer Society ,2018).

A prevalent outcome of cancer and its treatment is suboptimal nutritional status among neonates who have been diagnosed with the disease. There is a correlation between these nutritional deficiencies and heightened rates of illness and death. They have been linked to an array of causes, which vary according to the specific cancer type, treatment, and individual patient. The therapeutic strategy comprises psychosocial interventions, pharmacotherapy, and surgical intervention (Pui CH et al., 2015).

Despite the fact that the progress made in acute myeloid leukaemia (AML) has not been particularly remarkable, it has been consistent, with overall survival rates close to 70 percent after five years. There are not many longitudinal studies that have been conducted on the survival rates of childhood cancer in India. In spite of this, there is research that has been published indicating that there has been positive progress in the outcomes of childhood ALL. Even while the amount of development that has been made in India has been far less significant (Gupta A et al., 2015).

Although the overall prevalence of leukaemia is very low, it is the most prevalent kind of cancer that affects children. It is responsible for thirty percent of all malignancies that are detected in children younger than fifteen years old. Within this cohort, acute lymphocytic leukaemia (ALL) is diagnosed roughly approximately five times more commonly than acute myelogenous leukaemia (AML), and it is responsible for around 78% of all leukaemia diagnoses in children. (Oeffinger KC et al., 2016).

Cancer ranks as the second most prevalent cause of mortality among children aged 0 to 14 years, with accidents being the primary cause of death. Leukaemia is the most commonly occurring type of cancer in adolescents, constituting around

one-third of all cancers in this age group. Approximately 3,800 minors are admitted to the United States of America (U.S.) annually after receiving a diagnosis of acute lymphoblastic leukaemia (ALL) or acute myeloblastic leukaemia (AML) (American Cancer Society, 2016).

Malnutrition is a prevalent complication observed in children diagnosed with cancer. Research has established that malnutrition plays a substantial role in treatment resistance, heightened morbidity, unfavourable prognosis, diminished quality of life, and increased healthcare expenditures (Koirala S ,2021).

Consistent physical activity and a nutritious diet are significant contributors to the prevention of chronic diseases and the maintenance of good health across all stages of life. This is also reflected at the national level in many nations, where dietary guidelines advise "regular physical activity and sedentary behaviour reduction for health promotion. (US Department of Health and Human Services, 2015).

By analysing the intricate relationship between diet, physical activity, and improved cancer outcomes, incidence of the disease was significantly reduced and survival rates were significantly increased (American Cancer Society, 2017).

At present, exercise and nutrition are regarded as integral components of therapy that are critical for alleviating the adverse effects of active cancer treatment, particularly fatigue associated with cancer (Schmitz KH et al., 2019).

Specific guidelines regarding moderate aerobic exercise for the purpose of nutrition and muscle strengthening are recommended by the World Cancer Research Fund (Daudt H et al., 2017).

These guidelines include increasing the consumption of plant-based foods, decreasing the intake of red and processed meat, limiting energy-dense foods, salt, sugary drinks, and alcohol, and refraining from the use of dietary supplements. The existing body of literature provides extensive discussion on the benefits of physical activity, including improved fitness, decreased psychological distress, and enhanced cognitive abilities. In contrast, nutritional consultations may be beneficial in addressing the difficulties associated with cancer-related fatigue, such as anaemia, diarrhoea, nausea, and vomiting (American Institute for Cancer Research, 2017).

The activities of daily living can be further categorised into personal activities of daily living, which pertain to fundamental self-maintenance (e.g., eating, showering, toileting, and dressing), and those activities that are typically employed to evaluate and predict the developmental stages of children. Additional activities that are considered instrumental activities of daily living consist of household chores, such as cooking, cleaning, purchasing, and laundering, which are frequently used to assess the degree of dependence or disability of elderly patients, as well as access tasks, including driving and mobile use. More specifically, health professionals frequently assess the functional status by evaluating the ability to perform Activities of Daily Living (Rhoads et al.,2016).

Additionally, the functioning of daily living activities demonstrates children's capacity to operate objects without external assistance. However, young children frequently require adult assistance to perform the functions of playing, feeding, sleeping, bathing, socialising, and feeding, feeding, sleeping, and playing independently in the home, school, community, or workplace (Bates HH ,2015).

**Methodology**

Descriptive (Cross sectional) study was conducted on children with Leukemia in Holy Karbala City between the period of (22 June 2022) to (26 January 2024). To assessment the association between Food Frequency Intake and daily living activities among children with leukemia.

The study was carried-out in three hospital in Holy Karbala, was two in Holy Karbala Health Department, Karbala Children's Teaching Hospital and Imam Hassan Al-Mujtaba Teaching Hospital, and the third hospital was Warith International Cancer Institute. Samples were taken using a convenience sampling method for all children with leukemia who had been admitted to the hospitals or visited a hematology consultant. The children's ages were from 6 to 16 years. The total number of participants was 170 child with leukemia.

According to the literature review of previous studies related to Food Frequency Intake and activity of daily life, we prepared a questionnaire to measure dietary Habits, which includes dietary Habits, Food Frequency Intake, and the amount of food items intake. And we used a scale to measure activity of daily living. Comparing the relationship between Food Frequency Intake and daily life activity for the sample taken for children with leukemia (Appendix D). A tool in the form of a questionnaire was built for the purpose of the study.

**Results**

**Table 4-1.Distribution of Studied Sample related to their Socio-demographic Data**

| Socio-demographic data | Classification | No. | % |
|---|---|---|---|
| Age<br>M ± SD= 9.91 ± 3.10<br>Min.-Mix.= 6-16 | 6-9 years | **84** | **50.9** |
| | 10-13 years | 46 | 27.9 |
| | >13 years old | 35 | 21.2 |
| Gender | Male | **118** | **71.5** |
| | Female | 47 | 28.5 |
| Residents | Rural | 59 | 35.8 |
| | Urban | **106** | **64.2** |
| Is he/she student | Yes | 118 | 71.5 |
| | No | 47 | 28.5 |
| Father Education | Illiterate | 9 | 5.5 |
| | Able to read & write | 9 | 5.5 |
| | Elementary school graduate | 22 | 13.3 |
| | Intermediate school graduate | 15 | 9.1 |
| | Secondary school graduate | 22 | 13.3 |
| | Diploma | **52** | **31.5** |
| | Bachelor's | 36 | 21.8 |
| Mothers Education | Illiterate | 10 | 6.1 |
| | Able to read & write | 24 | 14.5 |
| | Elementary school graduate | 18 | 10.9 |
| | Intermediate school graduate | 19 | 11.5 |

| | | | |
|---|---|---|---|
| | Secondary school graduate | 13 | 7.9 |
| | Diploma | **39** | **23.6** |
| | Bachelor's | 33 | 20.0 |
| | Post-graduate | 9 | 5.5 |
| Fathers occupation | Employed | **97** | **58.8** |
| | Unemployed | 68 | 41.2 |
| Mothers occupation | Employed | **84** | **50.9** |
| | Unemployed | 81 | 49.1 |
| Parent relationship | Linked | **123** | **74.5** |
| | Divorced | 22 | 13.3 |
| | Separated | 15 | 9.1 |
| | Widow | 5 | 3.0 |
| Parents consanguinity | Yes | 70 | 42.4 |
| | No | **95** | **57.6** |
| History of Leukemia | Yes | 59 | 35.8 |
| | No | **106** | **64.2** |
| History of Diagnosis | <1 year | 71 | 43.0 |
| | >1 year | **94** | **57.0** |
| Treatment Modalities | Chemotherapy | **85** | **51.5** |
| | Radiotherapy | 7 | 4.2 |
| | Both | 73 | 44.2 |

*No. Number; %= Percentage*

When examining the demographic characteristics of the 165 children with leukemia who participated in this study, we found that their ages ranged from 6 to 16 years, with 71.5% of participants being male, participants being females 28.5%. Urban dwellers were the majority, making up 64.2%, with 35.8% from rural areas. 71.5% classified as students, as opposed to 28.5% who were not currently in school.

We found that a substantial portion of fathers and mothers had graduated with a diploma, accounting for 31.5% and 23.6%, respectively. Regarding parental occupation, 58.8% of fathers and 50.9% of mothers were gainfully employed. The parents' relationship status, the majority, comprising 74.5%, reported being in a linked or together relationship. When it came to the contingency between parents, 57.6% expressed that there was no contingency between them.

**Table 4-2. Food Frequency Intake among Leukemic Children**

| NO. | Food Frequency Items | Never | Once/ month | Once/ week | Most a day (3-6) | Every day | M.s | Ass. |
|---|---|---|---|---|---|---|---|---|
| | | No. | No. | No. | No. | No. | | |
| 1 | How often did you eat breakfast | 58 | 58 | 17 | 29 | 3 | 1.85 | Low |
| 2 | How often did you eat chocolate | 33 | 9 | 56 | 60 | 7 | 2.99 | Moderate |
| 3 | How often did you eat crisps | 31 | 30 | 46 | 51 | 7 | 2.84 | Moderate |
| 4 | How often did you eat fruit | 43 | 43 | 37 | 32 | 10 | 2.53 | Moderate |
| 5 | How often did you drink coffee | 40 | 40 | 58 | 21 | 6 | 2.47 | Moderate |
| 6 | How often did you drink tea | 40 | 32 | 59 | 23 | 11 | 2.59 | Moderate |
| 7 | How often did you drink cola | 48 | 22 | 47 | 38 | 10 | 2.64 | Moderate |
| 8 | How often did you drink energy drinks | 61 | 45 | 16 | 32 | 11 | 2.32 | Low |
| 9 | How often did you chew gum | 38 | 33 | 50 | 29 | 15 | 2.70 | Moderate |
| 10 | How often did you eat sweets | 45 | 46 | 43 | 19 | 12 | 2.44 | Moderate |
| 11 | How often did you eat fast-food | 34 | 16 | 54 | 53 | 8 | 2.91 | Moderate |
| 12 | How often did you eat pies or pasties | 39 | 27 | 41 | 50 | 8 | 2.76 | Moderate |
| 13 | How often did you eat processed meat | 41 | 81 | 33 | 20 | 0 | 2.31 | Low |
| 14 | How often did you eat fish | 42 | 79 | 24 | 20 | 0 | 2.13 | Low |
| 15 | How often did you eat vegetables | 46 | 32 | 39 | 35 | 13 | 2.61 | Moderate |
| 16 | How often did you eat chips | 35 | 23 | 49 | 50 | 8 | 2.84 | Moderate |
| 17 | How often did you eat beans of peas | 41 | 38 | 39 | 36 | 11 | 2.62 | Moderate |

*Level of Assessment (Low= 1-2.33; Moderate= 2.34-3.66; High= 3.67-5)*

In the context of the statistical mean, the presented table highlights the responses of children with leukemia regarding the frequency of their food intake. This can be seen from the continuous overall mean that ranged between 1.85 and 2.99 for all items assessed in the questionnaire, the item "How often did you eat breakfast?" The answers were low 1.85, and the item "How often did you eat chocolate" where the responses were 2.99.

**Table 4-3.4. Overall Food Frequency Intake among Leukemic Children**

| Scale | Min. | Max. | M | SD | Score | No. | % |
|---|---|---|---|---|---|---|---|
| Food Frequency Intake (17 Q) | 27 | 74 | 43.61 | 14.82 | Low (17-39.66) | 59 | 35.7 |
| | | | | | Moderate (39.67-62.33) | 103 | 62.5 |
| | | | | | High (62.34-85) | 3 | 1.8 |
| | | | | | Total | 165 | 100.0 |

*Min.: Minimum; Max.: Maximum, M: Mean for total score, SD=Standard Deviation for total score*

The findings highlight the variety of responses of children with leukemia regarding their food frequency intake. Their food frequency intake scores range from 27 to 74 on the rating scale. The overall mean score was calculated at 43.61, accompanied by a standard deviation of 14.82. The results indicates that a large majority (62.5 %) of children showed moderate food frequency intake.

**Table 4-4. Overall Domain Activities Daily Living among Leukemic Children**

| Domains | Scores | No. | % | M (±SD) | Ass. |
|---|---|---|---|---|---|
| Clothing | Low (5-8.33) | 49 | 29.7 | 9.41±2.90 | Moderate |
| | Moderate (8.34-11.66) | 85 | 51.5 | | |
| | High (11.67-15) | 31 | 18.8 | | |
| | Total | 165 | 100.0 | | |
| Motor activities | Low (5-8.33) | 50 | 30.3 | 9.31±2.84 | Moderate |
| | Moderate (8.34-11.66) | 81 | 49.1 | | |
| | High (11.67-15) | 34 | 20.6 | | |
| | Total | 165 | 100.0 | | |
| School activities | Low (6-10) | 51 | 30.9 | 7.97±3.47 | Low |
| | Moderate (10.1-14) | 94 | 57.0 | | |
| | High (14.1-18) | 20 | 12.1 | | |
| | Total | 165 | 100.0 | | |
| Play and hobbies | Low (4-6.66) | 50 | 30.3 | 5.89±2.42 | Low |
| | Moderate (6.67-9.33) | 78 | 47.3 | | |
| | High (9.34-12) | 37 | 22.4 | | |
| | Total | 165 | 100.0 | | |
| Personal hygiene | Low (8-13.33) | 91 | 55.2 | 13.07±3.83 | Low |
| | Moderate (13.34-18.66) | 64 | 38.8 | | |
| | High (18.67-24) | 10 | 6.1 | | |
| | Total | 165 | 100.0 | | |
| Eating and drinking | Low (2-3.33) | 37 | 22.4 | 3.7±1.07 | Moderate |
| | Moderate (3.34-4.66) | 72 | 43.6 | | |
| | High (4.67-6) | 56 | 33.9 | | |
| | Total | 165 | 100.0 | | |
| Sleeping | Low (3-5) | 106 | 64.2 | 4.93±1.72 | Low |
| | Moderate (5.1-7) | 44 | 26.7 | | |
| | High (7.1-9) | 15 | 9.1 | | |
| | Total | 165 | 100.0 | | |

*M: Mean for total score, SD=Standard Deviation for total score*

The results reveal a wide range of responses among children with leukemia regarding their daily activities. When it came to clothing, approximately 51.5% of children showed a moderate level of activities of daily living, with a mean score of 9.41 ± 2.90. In the field of motor activities, about 49.1% of the children showed an average level of daily life activities, obtaining an average of 9.31±2.84. Regarding school activities, approximately 57% of the children showed a moderate level of activities of daily living, with a mean score of 7.97 ± 3.47. As for play and hobbies, approximately 47.3% of children indicated a moderate level in activities of daily life, obtaining an average of 5.89±2.42.

Regarding personal hygiene, the results indicate that 55.2% of children showed a lower level of activities of daily living, with an average score of 13.07±3.83. When it came to eating and drinking, a similar proportion of 43.6 % of children expressed a moderate level of activities of daily living, with a mean score of 3.7 ± 1.07. Finally, regarding sleep-related activities, the majority, approximately 64.2% of children, showed a lower level of activities of daily living, with a mean score of 4.93±1.72.

**Table 4-5. Overall Activities Daily Living among Leukemic Children**

| Scale | Min. | Max. | M | SD | Score | No. | % |
|---|---|---|---|---|---|---|---|
| Activities Daily Living (33 Q) | 39 | 94 | 54.28 | 16.20 | Low (33-55) | 43 | 26.1 |
| | | | | | Moderate (55.1-77) | 108 | 65.5 |
| | | | | | High (77.1-99) | 14 | 8.5 |
| | | | | | Total | 165 | 100.0 |

*Min.: Minimum; Max.: Maximum, M: Mean for total score, SD=Standard Deviation for total score*

The findings highlight the variety of responses of children with leukemia regarding their activities daily living. Their activities scores range from 39 to 94 on the rating scale. The overall mean score was calculated at 54.29, accompanied by a standard deviation of 16.20. The results indicates that a large majority (65.5%) of children showed moderate activities of daily living.

**Table 4-6. Association between Food Frequency Intake and Activities Daily Living among Children with Leukemia**

| Correlation Statistics | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1.Food frequency intake | 1 | | | | | | | | |
| 2.Clothing Activities | .625** | 1 | | | | | | | |
| 3. Motor Activities | .615** | .577** | 1 | | | | | | |
| 4. School Activities | .636** | .724** | .614** | 1 | | | | | |
| 5. Play Activities | .612** | .642** | .626** | .729** | 1 | | | | |
| 6.Personal hygiene | .441** | .494** | .410** | .566** | .518** | 1 | | | |
| 7. Eating and Drinking | .357** | .524** | .333** | .540** | .526** | .366** | 1 | | |
| 8. Sleeping | .375** | .485** | .421** | .440** | .382** | .309** | .293** | 1 | |
| 9. Overall LDA | .721** | .720** | .737** | .835** | .774** | .652** | .544** | .495** | 1 |

**. Correlation is significant at the 0.01 level (2-tailed).

The study revealed a significant positive correlation between the food frequency intake among children with leukemia and their daily living activities. This correlation was observed in various aspects of activities of daily living, including clothing ($r = 0.625$; $p < 0.001$), motor activities ($r = 0.615$; $p < 0.001$), school activities ($r = 0.636$; $p < 0.001$), play and hobbies ($r = 0.612$; $p < 0.001$), personal hygiene ($r = 0.441$; $p < 0.001$), eating and drinking ($r = 0.357$; $p < 0.001$), sleeping ($r = 0.735$; $p < 0.001$), and overall daily living activities ($r = 0.721$; $p < 0.001$).

**Discussion of the Study Results**

**5.1. Distribution of Studied Sample related to their Socio-demographic Data**

The findings of the study of 165 children with leukemia reveal several noteworthy demographic characteristics that provide valuable insights into the profile of the participants. First of all, the age range of the children participating in the study ranged from 6 to 16 years. The mean age of 9.91 ± 3.10 years indicates a relatively young cohort, highlighting the prevalence of leukemia in early childhood and adolescence.

Gender distribution appears to be an important factor, with a clear predominance of males in the study. 71.5% of the participants were male, while females made up the remaining 28.5%. This gender disparity raises questions about possible biological or environmental factors that contribute to higher leukemia rates in boys. Further exploration of the reasons behind this gender skew may be useful for understanding and treating childhood leukemia. This result agrees with with (Niklas Gunnarsson 2017) who studying (Chronic myeloid leukemia and cancer). their study is mentioned that majority of participating regarding the gender distribution was 60% of the participants were male, while females made up the remaining 40%.

Residence patterns also come out on top, with 64.2% of children residing in urban areas and 35.8% in rural areas. This urban dominance can be linked to factors such as access to health care facilities, environmental exposure, or socioeconomic status, emphasizing the need to consider these variables in the context of leukemia prevalence and outcomes. This result is similar to that (Muntadher Al-Suwaid 2019) who studying (Complications Preventive Strategies of Children with Leukemia from Mothers' Perspectives in Al-Basrah Province) their study is shown that the Majority of the population are living in urban estimating as (72.7%) and rural (27.3) .

The educational background of the parents is another important aspect explored in the study. A significant percentage of fathers (31.5%) and mothers (23.6%) graduated with a diploma. This information underscores the need to study the potential impact of parental education on childhood leukemia incidence and management. Understanding the role of education in health-seeking behavior and adherence to treatment regimens can guide interventions to improve outcomes for affected children. This result disagrees with with (Mohammad Kajiyazdi et al 2022) who studying "The Effect of Parents' Education on the Prevalence of Acute Leukemia in Children". According to his research, the educational attainment of parents in the healthy group was as follows: 50.7% held associate or bachelor degrees, 23.5% held master's degrees, and 72.7% held an associate degree or less, with 7.8% holding a master's degree.

Parents' occupation was also highlighted, revealing that 58.8% of fathers and 50.9% of mothers were gainfully employed. This information is essential to understanding the social and economic context in which these families overcome the challenges of childhood leukemia. It urges consideration of potential financial barriers to accessing health care and the impact of parental employment on the ability to support a child through treatment. This result is inconsistent with (Dwi Novrianda 2015) study "The effect of educational intervention on the quality of life of acute lymphocytic leukemia who undergoing chemotherapy" their study finding indicated that the more generally the Parents' did not work with (83.3%).

The study delves into the family dynamics of the participants, indicating that the majority (74.5%) of parents reported being in an attached or together relationship. In addition, 57.6% of parents expressed that they did not have an Parents consanguinity relationship. Understanding family structures and

dynamics is vital, as it can greatly impact the emotional and logistical support available to a child undergoing leukemia treatment. This result disagrees with with (Ali Gholami et al 2017) who studying "Parental Risk Factors of Childhood Acute Leukemia: A Case- Control Study". His findings indicated that the parents relationship (78%) was separated and parents relationship bonded was (22%).

And this result is similar to that (Abdulbari Bener et al 2015) who studying "Consanguinity and family history of cancer in children with leukemia and lymphomas" their study is shown that a proportion of 50.5% of the indigenous population of the United Arab Emirates (UAE) is married consanguineously. The purpose of this research was to ascertain whether there are any differences in the rates of consanguinity and family history of cancer between the families of children with lymphoid malignancy and the general population.

Family history appears to be a relevant factor, with 64.2% of children indicating no known family history of leukaemia. This finding role of the environmental factor predisposition in childhood leukaemia. Further studies and genetic investigations into possible environmental factors could shed light on the etiology of these cases. This result agrees with with (Sahar Mehranfar et al 2017) who studying "History of Leukemia: Diagnosis and Treatment from Beginning to Now". His findings indicated that with 59% of children indicating no known family history of leukaemia.

Regarding the duration of leukemia diagnosis, 57.0% of children were diagnosed for more than 1 year, indicating a large proportion with prolonged exposure to the challenges of disease management, and the possibility of living with this disease. Longitudinal studies that track the outcomes of these conditions over time can provide valuable insights into the trajectories of childhood leukemia and the effectiveness of interventions. This result disagrees with with (Rosnah Sutan et al 2017) who studying "Coping Strategies among Parents of Children with Acute Lymphoblastic Leukemia". His findings indicated that at the time of diagnosis, the average age of the children was 4.5 ±2.9 years.

Finally, the prevalent use of chemotherapy as a treatment modality (51.5%) underscores the importance of understanding the therapeutic landscape in pediatric leukemia. Exploring the reasons behind the choice of specific treatment methods and evaluating their effectiveness and side effects is crucial to improving treatment methods and improving overall outcomes for affected children. This result is consistent with (Ahmed Motohiro Kato 2018) study " Treatment and biology of pediatric acute lymphoblastic leukemia" their study finding indicated that the most of the ideal option for treating children with leukemia was chemotherapy, and the percentage of children receiving this treatment was 60% of the sample taken.

**5.2 Food Frequency Intake among Leukemic Children**

The wide range of scores (27 to 74) on the rating scale indicates that there is great variation in the dietary habits of children with leukemia. This raises questions about the factors that influence their food choices. Are there cultural, socio-economic, or individual factors that contribute to this diversity? Understanding these factors could be crucial for developing tailored interventions to improve the nutritional status of these children. These results supported by a similar result (Elena J. et al 2019) their studying " Fluctuations in dietary intake during treatment for childhood leukemia ". their findings The study indicates that dietary intake for acute lymphoblastic leukaemia patients fluctuates during treatment, relative to age-gender recommended and normative values. Enhancing our comprehension of variations in dietary quality and nutrient levels will enable subsequent investigations to examine the connections between dietary consumption, toxicity, and survival.

A mean score of 43.61 with a standard deviation of 14.82 indicates a moderate level of frequent eating on average, but with a large degree of inter-individual variation. Discussion of the standard deviation is important because it provides insight into the degree of dispersion around the mean. Analysis of this prevalence can help identify subgroups of children who have particularly low or high food intake, allowing for targeted interventions. This result agrees with other result (Usama et al 2022) their studying" Assessment of the Nutritional Status of the Children with Acute Leukemia on Chemotherapy in Karbala City " their study finding indicated The data indicated that the effect of dietary habits can be succinctly described as follows: minors undergoing chemotherapy consume diets of moderate quality, albeit in limited quantity.

The fact that 62.5 % of children eat moderate amounts of food suggests that the vast majority of them fall within a similar range. Understanding the effects of this moderate intake is essential. Does this level of nutrition meet the nutritional requirements of children with leukemia. What are the possible consequences of differences in eating intake on health outcomes and response to treatment.

Examining the distribution of scores can help identify subgroups that may be at risk for insufficient or excessive food intake. For example, are there specific age groups, gender, or treatment stages that particularly require nutritional interventions? Identifying these vulnerable populations can guide healthcare professionals in designing nutritional support strategies. This result conducted by " A. Kellyet al., 2018) their studying (Effect of Glucocorticoid Therapy on Energy Intake in Children Treated for Acute Lymphoblastic Leukemia". Their researchers showed that Patients undergoing treatment for acute lymphoblastic leukaemia in children are significantly more likely to acquire weight and develop obesity as a result of the substantial increase in energy intake caused by glucocorticoid therapy.

Exploring factors that influence frequent food intake in children with leukemia is crucial for developing effective interventions. Are there psychological, social, or treatment-related factors that influence their food choices? Understanding underlying drivers can inform the development of targeted interventions and support systems. This finding is similar to that (Elena J. Ladas et al, 2019) their studying " Fluctuations in dietary intake during treatment for childhood leukemia" their study finding indicated study suggests that Dietary intake fluctuates during ALL treatment relative to normative and age-gender-recommended values. Further examination of the correlations between dietary consumption, toxicity, and survival will be facilitated by an enhanced comprehension of nutrient fluctuations and dietary quality.

It may be useful to compare the frequent food intake of children with leukemia with their healthy counterparts. This comparative analysis can highlight specific challenges or patterns unique to

the populations being studied, providing a broader context for understanding their nutritional needs and guiding interventions. This result disagrees with (Rhea Li MPH 2017) his studying " Malnutrition and obesity in pediatric oncology patients: Causes, consequences, and interventions" his study finding indicated that data showed Suboptimal nutritional status is a frequent consequence of the disease and its treatment among infants diagnosed with cancer. Depending on the type and treatment of cancer and the patient, these nutritional conditions have been linked to a variety of aetiologies and are associated with increased morbidity and mortality. Pharmacotherapy, psychosocial interventions, and surgical management are all included.

In summary, discussion of these findings provides an opportunity to delve deeper into the complexities of dietary habits among children with leukemia. By exploring factors that influence frequency of eating and identifying at-risk groups, healthcare professionals can develop targeted interventions to improve nutritional outcomes and enhance the overall well-being of these children during their treatment journey.

**5.3: Overall Domain Activities Daily Living among Leukemic Children**

The findings presented in this study provide valuable insights into activities of daily living for children with leukemia. The evaluation included various aspects of their lives, including clothing, motor activities, school activities, toys and hobbies, personal hygiene, eating and drinking, and sleep-related activities. The results show a variety of responses among these children, highlighting the challenges they face and their overall performance in various areas.

One notable observation is that a large proportion of children with leukemia showed a moderate level of activities of daily living across the different groups. This indicates resilience and adaptability among these children, indicating that they actively participate in and manage their daily routines despite the impact of leukemia on their lives. For example, in the context of school activities, more than half of the children showed an average level of performance, with an average of 11.13. This finding suggests that many children with leukemia are still able to participate in educational activities, albeit with some challenges. This result disagrees with (marta et al 2020) their studying " Pediatric Patients Treated for Leukemia Back to School: A Mixed-Method Analysis of Narratives about Daily Life and Illness Experience" their study finding indicated that data showed leukemia in children can impact their participation in school activities through factors such as social support, treatment-related effects on academic performance, and motor skill delays. Early educational intervention and support are recommended for children affected by leukemia to mitigate these challenges.

On the other hand, the results also point to specific areas where children with leukemia may face greater difficulties. Personal hygiene and sleep-related activities, in particular, emerged as areas in which a large proportion of children showed lower levels of activities of daily living. These findings highlight potential areas for targeted support and intervention, as difficulties with personal hygiene and sleep-related activities could have wider implications for the wellbeing and quality of life of these children. This result consistent with (Dominik Gaser et al 2022) their studying " Effects of strength exercise interventions on activities of daily living, motor performance, and physical activity in children and adolescents with leukemia or non-Hodgkin lymphoma: Results from the randomized controlled Active ADL Study" their study is mentioned the leukemia in children can impact personal hygiene and sleep-related activities. Children may experience difficulties with oral hygiene practices due to the effects of treatment. Sleep disturbances, such as excessive daytime sleepiness and sleep-disordered breathing, are common in children with cancer, particularly those with neoplasms involving the CNS.

The overall mean of 59.40 on the rating scale, with a standard deviation of 16.20, provides a comprehensive summary of children's activities in daily life. The fact that 65.5% of children showed moderate activities in daily life confirms the resilience of this population and the strength of their adaptation to the disease. However, it is important to recognize the diversity within this group as 26.1% had low activities and needed to depend on their family in their daily lives, as evidenced by a wide range of scores (39 to 94). This disparity underscores the need for tailored approaches to support each child based on their unique challenges and strengths. This result Congruent with that (Nuhad Aldoori et al, 2020) their studying " Daily Living Activities of School Age Children with Acute Lymphocytic Leukemia at Welfare Pediatric Teaching Hospital" their study finding indicated A significant proportion of children experience symptoms, clinical signs, and complications associated with acute lymphocytic leukaemia. A significant proportion of children with acute lymphocyte-cytic leukaemia experience a moderate impact on their daily activities. This result disagrees with (Aleksandra Kowaluk et al 2019) their studying " Physical Activity and Quality of Life of Healthy Children and Patients with Hematological Cancers" their study finding indicated that A shortage of physical activity is a critical determinant that adversely impacts the quality of life and fosters a sense of dependence among children diagnosed with cancer. The findings of the research indicated that children who were receiving cancer treatment exhibited diminished physical fitness and a general state of unwell-being. Children whose cancer was successfully treated exhibited marked improvements in their overall health and physical endurance.

In conclusion, the study contributes valuable information to our understanding of how children with leukemia cope in their daily lives. The findings underscore the importance of considering multiple dimensions of activities of daily living and designing interventions to address the specific challenges faced by these children, with the ultimate goal of enhancing their overall well-being and quality of life.

**5.4: Association between Food Frequency Intake and Activities Daily Living among Children with Leukemia**

The study revealed a significant positive correlation between the food frequency intake among children with leukemia and their daily living activities. This correlation was observed in various aspects of activities of daily living, including clothing ($p < 0.001$), motor activities ($p < 0.001$), school activities ($p < 0.001$), play and hobbies ($r = 0.612$; $p < 0.001$), personal hygiene ($p < 0.001$), eating and drinking ($p < 0.001$), sleeping ($p < 0.001$), and overall daily living activities ($p < 0.001$).

there is limited information on the direct relationship between food frequency intake among children with leukemia and their daily living activities. However, there are several studies that provide insights related to dietary intake and childhood leukemia, which may indirectly impact their daily living activities. The results obtained from the current study came along with a previous study entitled " Dietary intake and childhood leukemia: The Diet and Acute Lymphoblastic Leukemia Treatment (DALLT) cohort study." which was indicated Children with acute lymphoblastic leukemia (ALL) are at high risk of developing nutritional-related diseases during and after treatment, which leads to instability in their daily activities and behavior (Burbank et al 2016).

And this result agrees with another study (Sgarbieri et al 2017) their study (Nutritional assessment and serum zinc and copper concentration among children with acute lymphocytic leukemia: a longitudinal study.). His findings indicated the nutritional evaluation studies have shown that children with acute lymphocytic leukemia may suffer from nutritional disorders due to the effects of chemotherapy and radiotherapy. Treatment can affect their growth rate, lead to weight loss, and change levels of behavior, activity, and cognition

**Conclusion**

Conclusion: Children with leukemia are affected by the treatments used, such as chemotherapy or radiation, and this in turn affects the children's loss of appetite, and thus they eat meals of average quality and small quantity. Which negatively affects children's daily life activities.

**Recommendations**

Recommendations: Parents of children must be educated on the negative effects that result from malnutrition and its impact on the time and rate of their recovery from the disease, and focus on improving dietary habits, their diversity and the number of main meals the child eats to provide him with energy and growth, and encourage sick children to rely on themselves for their special needs. Providing detailed scientific information about the disease in an appropriate way to explain it to the children's parents.

**References**

*1. Al-khateeb, D. A. N., Al-hafidh, A. H., & Al-jumaily, U. A. H. Nutritional evaluation of the children and teenagers at the diagnosis time of acute leukemia. 2022*

*2. Al-Musawi, K. M., Aldoori, N., Ajil, Z. W., Qasem, R., Ali, H., & Ammar, S. (2020). Daily Living Activities of School Age Children with Acute Lymphocytic Leukemia at Welfare Pediatric Teaching Hospital. Indian Journal of Forensic Medicine & Toxicology, 14(3), 1411-1417.*

*3. American Cancer Society. Breast Cancer Facts and Figures 2017–2018. Atlanta, GA: American Cancer Society (2017).*

*4. Bates HH. ,Daily Physical Activity for Children and Youth ,Alberta Education , Canada, 2015 pp6-20 .*

*5. Beaulieu-Gagnon, S., Bélanger, V., & Marcil, V. (2019). Food habits during treatment of childhood cancer: a critical review. Nutrition research reviews, 32(2), 265-281.*

*6. Beaulieu-Gagnon, S., Bélanger, V., & Marcil, V. (2019). Food habits during treatment of childhood cancer: a critical review. Nutrition research reviews, 32(2), 265-281.*

*7. Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: a cancer journal for clinicians, 68(6), 394-424.*

*8. Chouvarine, P., Antić, Ž., Lentes, J., Schröder, C., Alten, J., Brüggemann, M., ... & Bergmann, A. K. (2021). Transcriptional and mutational profiling of B-other acute lymphoblastic leukemia for improved diagnostics. Cancers, 13(22), 5653.*

*9. Cox, C. L., Zhu, L., Kaste, S. C., Srivastava, K., Barnes, L., Nathan, P. C., ... & Ness, K. K. (2018). Modifying bone mineral density, physical function, and quality of life in children with acute lymphoblastic leukemia. Pediatric blood & cancer, 65(4), e26929.*

*10. D'Souza V, Daudt H, Kazanjian A. Survivorship care plans for breast cancer patients: understanding the quality of the available evidence. Curr Oncol. (2017) 24:446–65. doi: 10.3747/co.24.3632.*

*11. Ferlay, J., Colombet, M., Soerjomataram, I., Mathers, C., Parkin, D. M., Piñeros, M., ... & Bray, F. (2019). Estimating the global cancer incidence and mortality in 2018: GLOBOCAN sources and methods. International journal of cancer, 144(8), 1941-1953.*

*12. Gaser, D., Peters, C., Oberhoffer-Fritz, R., Götte, M., Feuchtinger, T., Schmid, I., ... & Kesting, S. (2022). Effects of strength exercise interventions on activities of daily living, motor performance, and physical activity in children and adolescents with leukemia or non-Hodgkin lymphoma: Results from the randomized controlled ActiveADL Study. Frontiers in Pediatrics, 10, 982996.*

*13. Gholami, A., Salarilak, S., Hejazi, S., & KHALKHALI, H. (2011). Parental risk factors of childhood acute leukemia: a case-control study.*

*14. Gunnarsson, N. (2017). Chronic myeloid leukemia and cancer (Doctoral dissertation, Umeå universitet).*

*15. Gupta A, Kapoor G, Jain S, Bajpai R. Absolute lymphocyte count recovery independently predicts outcome in childhood acute lymphoblastic leukemia: Experience from a tertiary care cancer center of a developing country. J Pediatr Hematol Oncol 2015;37:e143-9.*

*16. Kajiyazdi, M., Jafari, M., & Eftekhari, K. (2022). The Effect of Parents' Education on the Prevalence of Acute Leukemia in Children. Journal of Comprehensive Pediatrics, 13(1).*

*17. Kato, M., & Manabe, A. (2018). Treatment and biology of pediatric acute lymphoblastic leukemia. Pediatrics International, 60(1), 4-12.*

*18. Kowaluk, A., Woźniewski, M., & Malicka, I. (2019). Physical activity and quality of life of healthy children and patients with hematological cancers. International journal of environmental research and public health, 16(15), 2776.*

*19. Mehranfar, S., Zeinali, S., Hosseini, R., Akbarzadeh, A., Mohammadian, M., & Feizi, A. H. P. (2017). History of leukemia: diagnosis and treatment from beginning to now. Galen Medical Journal, 6(1), e702-e702.*

*20. Mitchell, H. R., Lu, X., Myers, R. M., Sung, L., Balsamo, L. M., Carroll, W. L., ... & Kadan-Lottick, N. S. (2019). Prospective, longitudinal assessment of quality of life in children from diagnosis to 3 months off treatment for standard risk acute lymphoblastic leukemia: Results of Children's Oncology Group study AALL0331. International journal of cancer, 138(2), 332-339.*

*21. Novrianda, D., & Khairina, I. (2015). The effect of educational intervention on the quality of life of acute lymphocytic leukemia who undergoing chemotherapy. Int J Res Med Sci, 3(1), 69-73.*

*22. Oeffinger KC, Mertens AC, Sklar CA, Kawashima T, Hudson MM, Meadows AT, Friedman DL, Marina N, Hobbie W, Kadan-Lottick NS, Schwartz CL, Leisenring W, Robison LL; Childhood Cancer Survivor Study. Chronic health conditions in adult survivors of childhood cancer. N Engl J Med 2016;355:1572-82.*

*23. Patel, A. V., Friedenreich, C. M., Moore, S. C., Hayes, S. C., Silver, J. K., Campbell, K. L., ... & Matthews, C. E. (2019). American College of Sports Medicine roundtable report on physical activity, sedentary behavior, and cancer prevention and control. Medicine and science in sports and exercise, 51(11), 2391.*

*24. Pui CH, Yang JJ, Hunger SP, Pieters R, Schrappe M, Biondi A, et al. Childhood acute lymphoblastic leukemia: Progress through collaboration. J Clin Oncol 2015;33:2938-48.*

*25. Rhoads, R. A., Berdan, J., & Toven-Lindsey, B. (2016). The open courseware movement in higher education: Unmasking power and raising questions about the movement's democratic potential. Educational Theory, 63(1), 87-110.*

*26. Sutan, R., Al-Saidi, N. A., Latiff, Z. A., & Ibrahim, H. M. (2017). Coping strategies among parents of children with acute lymphoblastic leukemia. Health, 9(07), 987.*

*27. Tremolada, M., Taverna, L., Bonichini, S., Pillon, M., Biffi, A., & Putti, M. C. (2020). Pediatric patients treated for leukemia back to school: a Mixed-Method analysis of narratives about daily life and illness experience. Behavioral Sciences, 10(7), 107.*

*28. Viner, R. M., Mytton, O. T., Bonell, C., Melendez-Torres, G. J., Ward, J., Hudson, L., ... & Eggo, R. M. (2021). Susceptibility to SARS-CoV-2 infection among children and adolescents compared with adults: a systematic review and meta-analysis. JAMA pediatrics, 175(2), 143-156.*

*29. Williams, L. K., & McCarthy, M. C. (2015). Parent perceptions of managing child behavioural side-effects of cancer treatment: a qualitative study. Child: care, health and development, 41(4), 611-619.*

*30. World Cancer Research Fund / American Institute for Cancer Research. Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective.Washington DC: AICR (2017).*

*31. Zeyad, B., Muntadher Kamel, F., Zeyad, Y., Mohammed Salim, M., & Ahmed Jalal, Y. (2023). Utilising Artificial Intelligence for Disease Classification and Prediction. Web of Synergy: International Interdisciplinary Research Journal, 2(9), 36-51.*