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Assessment of Nutritional Status and Dietary Habits of Patients with Leukaemia in District Peshawar

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ABSTRACT

Malnutrition due to cancer is a significant issue. Malnutrition in cancer patients leads to decreased response to therapy and tolerance, shorter remission periods, worse rates of survival, and higher risk of adverse effects, resulting in higher healthcare costs. Cancer patients often experience psychological discomfort, which can hinder their capacity to oversee self-care and attend therapy. This can lead to lower food intake and weight loss. Proper eating can help patients retain strength and energy while lowering the likelihood of treatment-related adverse effects. We would have the safest path to health if we could provide each person with the appropriate amount of nutrition and exercise, not too little and not too much. Leukaemia represents approximately 3.5% of all cancer cases and is characterized by the buildup of aberrant white blood cells. Pancytopenia might arise from reduced cell formation or increased destruction. The results show that a considerable portion of the patient population is experiencing challenges in meeting their nutritional needs, as seen by the prevalence of low to extremely low average calorie intake. According to these results, those who consume more calories on average are more likely to have higher body mass indices.

Keywords: Leukaemia, BMI, nutritional status, FFQ, malnutrition, SGA, pancytopenia, dietary habits

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CHAPTER 1

1.1 INTRODUCTION:

A World Health Organization research states that the quantity of fresh instances of cancer climbed globally in 2012 to 14.1 million, and that number is expected to increase to 21.4 million by 2030 **(Z Malihi et al., 2015).** Over 400,000 new instances of paediatric cancer are thought to be diagnosed worldwide each year **(Lam**, **Howard, Bouffet, & Pritchard-Jones, 2019)**. A class of cancerous illnesses are characterized by the uncontrolled growth and dissemination of abnormal cells., which, if left untreated, can be fatal **(Tarver, 2012).** Rapid growth of bodily cells is the first step towards cancer. Cancerous cells can develop in almost any portion of the body and spread to other parts as well. The bone marrow is the source of Chronic Lymphocytic Leukaemia (CLL), which results in the haphazard proliferation of a vast number of abnormal cells. The bone marrow is where leukaemia cells first appear. By then, enter the blood cells and result in a deadly illness. Acute lymphoblastic leukaemia (ALL), chronic myeloid leukaemia (CML), acute myeloid leukaemia (AML) and chronic lymphocytic leukaemia (CLL) are the four main kinds of leukaemia **(Chowdhury, Banik, Hossain, & Khaled, 2018)**. Malnutrition due to cancer is a significant issue. Malnutrition in cancer patients leads to decreased response to therapy and tolerance, shorter remission periods, worse rates of survival, and higher risk of adverse effects, resulting in higher healthcare costs (Esfahani et al., 2014). The term "lymphoblastic" refers to the fact that it comes from a subpopulation of white blood cells called early immature lymphocytes. Leukaemia cells frequently assault blood rather quickly. They can also occasionally spread to other bodily regions such the testicles, liver, spleen, lymph nodes, and central nervous system **(Chowdhury et al., 2018).** Cancer patients often experience psychological discomfort, which can hinder their the capacity to oversee self-care and attend therapy. This can lead to lower food intake and weight loss **(Daudt, Cosby, Dennis, Payeur, & Nurullah, 2012).** The hallmark of acute leukaemia is the proliferation of young, non-dividing cells in the bone marrow that are then released into the bloodstream. All acute leukaemia (ALL) are the most common childhood leukaemia, whereas AML primarily affects adults. These two diseases are associated with genetic conditions such as Down syndrome and previous exogenous bone marrow trauma. The excessive proliferation of juvenile cells in the bone marrow inhibits all other cell lines, resulting in paleness, coagulating splotches, and increased susceptibility to infections **(Chowdhury et al., 2018)**. Early detection of malnourished cancer patients is crucial for providing the right kind of nutritional assistance, which is a fundamental component of health care initiatives **(Esfahani et al., 2014).** Pallor and exhaustion from anaemia, bleeding or bruising from thrombocytopenia, and infection from neutropenia are all common signs of ALL. At diagnosis, leukemic infiltration of the spleen, liver, lymph nodes, and mediastinum is frequently seen. Therapy adjustments may be necessary for extramedullary leukaemia affecting the testicles or central nervous system (CNS) **(Hunger & Mullighan, 2015).**

Pancytopenia is a hematologic disease marked by a reduction in all three peripheral blood cell lineages. It is defined by a haemoglobin level of less than 12 g/dL in women and 13 g/dL in males, platelets of fewer than 150,000 per mcL, and leukocytes of less than 4000 per mL (or an absolute neutrophil count of less than 1800 per mL). However, these criteria are mostly determined by age, gender, ethnicity, and other clinical circumstances **(Chiravuri & De Jesus, 2023).** Cancer and its treatment can induce neurocognitive, psychosocial, and somatic symptoms that impact daily functioning **(Polat, BAKIR, & Ayçiçek, 2020).** In hematology-oncology

clinics, it is crucial to balance diet for patients (Zapolska et al., 2018). Cancer patients' nutritional health might drastically worsen during hospitalization (Polat et al., 2020). Childhood cancer patients' nutritional condition might deteriorate due to intestinal inflammation and malabsorption **(Cohen, Wakefield, Tapsell, Walton, & Cohn, 2017).** Nutrition has become more important in reducing treatment-related sickness, improving quality of life, and providing supportive care for children with cancer **(Selwood, Ward, & Gibson, 2010).** Maintaining adequate nutritional status during cancer treatment can enhance tolerance to chemotherapy in paediatric cancer patients, improve quality of life, and reduce the risk of infection **(Cohen et al., 2017).** Dietary restrictions can help prevent cancer patients from bacterial infections (Nicole Fox & Freifeld, 2012). Dietary restrictions imposed on cancer patients at risk for neutropenia are known as NDs **(Wiemels, 2012)**. These diets aim to minimize infections in neutropenic patients by limiting the intake of specific foods, such as fresh fruits and vegetables **(Moody, Finlay, Mancuso, & Charlson, 2006).** The NDs are also referred to as a "low bacterial diet" since cooking kills bacteria and other organisms found in these meals **(Sonbol, Firwana, Diab, Zarzour, & Witzig, 2015).** Children with cancer reported decreased hunger, altered smell and taste sensitivity, nausea from chemotherapy, and limited dietary options. Medical workers imposed dietary restrictions, making it difficult for youngsters to enjoy meals **(Polat et al., 2020).**

1.2 STATEMENT OF THE PROBLEM:

Leukaemia sufferers have dietary difficulties that affect their overall health. This study aims to fill in knowledge gaps about the dietary practices and nutritional status of people with leukaemia.

1.3 RESEARCH OBJECTIVES:

- To assess nutritional status of Leukaemia Patients.
- To determine the dietary habits of the patients in relation to disease.
- To find the association between pancytopenia and weight.
- To determine correlation between average daily calorie intake and BMI (kg/m^2).

CHAPTER 3

3.1 RESEARCH METHODOLOGY

An extensive and painstakingly constructed road map for the methodical investigation of the nutritional status and dietary practices of individuals with leukaemia is provided in this chapter, which also outlines the methodological framework utilized in this research endeavor, including the research approach, design, layout, target population, sampling strategy, sample size determination, data collection tools and methods, data analysis procedures, ethical considerations, data management protocols, and data distribution strategies.

3.2 STUDY DESIGN:

It was an observational study with cross sectional study design.

3.3 STUDY DURATION

The study was carried out from July 2023 to December 2023, a period of six months.

3.4 STUDY LOCATION:

The research was conducted at Peshawar.

3.5 STUDY POPULATION:

Subject suffering from leukaemia that were hospitalized to or visited the oncology OPD at different Hospitals of Peshawar included the study population.

3.6 INCLUSION CRITERIA:

The inclusion criteria of the research study included patients with leukaemia in both male and female genders and within all age groups.

3.7 EXCLUSION CRITERIA:

People with serious illnesses other than leukaemia that might have an adverse effect on their nutritional health, those who have a history of severe food allergies or intolerances that is recorded and might skew an accurate evaluation of dietary practices were excluded from the study population. Individuals who were participating in clinical trials linked to nutrition or other experimental nutritional therapies were also excluded. Pregnant and lactating women were also excluded from study population.

3.8 SAMPLE SIZE:

A thorough strategy was utilized to determine the sample size for this study, which included all patients who were either admitted to the hospital or visited the Outpatient Department (OPD) throughout the six-month study period that was set for July 2023 to December 2023. The choice to enroll all patients in the pool for this period of time was driven by the need to get a complete and representative sample of people with leukaemia diagnoses, guaranteeing a thorough investigation of dietary practices and nutritional condition in the targeted group. Total 200 patients were selected for the study.

3.9 SAMPLING TECHNIQUE:

Purposive sampling was used in sampling technique.

3.10 RESEARCH INSTRUMENT:

Data was gathered using a self-structured questionnaire that included both closed- and open-ended questions. Included in the questionnaire were:

1) Personal and Demographic History
2) Social History
3) ABCD of Nutritional Assessment
4) Medical History
5) Dietary Data as 3 day 24-hour recall
6) SGA
7) FFQ

3.10.1 PERSONAL AND DEMOGRAPHIC INFORMATION:

Based on demographic information including gender, age, and occupation, the patient's or caregiver's basic information was collected.

3.10.2 SOCIAL HISTORY:

Questions on socioeconomic status were posed, including understanding of nutrition and supplements, number of family members reliant on income, education level, and monthly income.

3.10.3 ANTHROPOMETRIC DATA:

Anthropometric Data included height, weight, MUAC, BMI and BMI status.

BIOCHEMICAL PROFILE:

RBCs, WBCs, and platelets were all counted in the whole CBC.

3.10.4 CLINICAL OR PHYSICAL EXAMINATION:

Physical examination included checking loss of body fat, loss of muscle mass, presence of oedema/ascites, skin hydration, skin color, lips, mouth, teeth/gums, nails, eyes, hair for any symptoms of micronutrients deficiency.

3.10.5 MEDICAL HISTORY:

The recent past medical history was taken and SGA AND SNAQ were incorporated into self-constructed questionnaire to check the malnutrition and appetite status.

3.10.6 DIETARY DATA:

For dietary data 3 days 24-hour dietary call and FFQ was filled.

3.11 ETHICAL CONSIDERATIONS:

The Abasyn University Peshawar Institutional Review Board/Ethics Committee granted ethical approval for the project, guaranteeing adherence to predetermined ethical standards. Before freely consenting to participate, participants were fully informed about the goals, methods, possible dangers, and advantages of the research. Each participant provided written consent, and they are free to leave the research at any time without facing any repercussions. The highest level of confidentiality was maintained for all participant information. To preserve people's privacy, personal identifiers were anonymized or pseudonymized. The study's data was safely preserved, and only authorized people had access to it, guaranteeing the confidentiality of study participants' identities. Participants received guarantees that their participation in the study would be voluntary and that they would not suffer any negative effects by leaving at any time. Participants were informed that their choice to participate or not would not affect their medical care or their connection with healthcare professionals, and the autonomy principle was upheld. Every attempt was made to reduce the participants' risk of bodily, psychological, or social damage. Participants were warned about any possible pain related to data collection, and dietary and nutritional evaluations were carried out with care. Sufficient means of assistance were established to tackle unanticipated negative consequences.

3.12 ANALYSIS:

Origin 8 and MS Office 2010 were used to evaluate the data.

CHAPTER 4

4.1 RESULTS, ANALYSIS AND DISCUSSION

4.1.1 SOCIODEMOGRAPHIC CHARACTERISTICS OF PATIENTS:

A population's age, gender, level of education, income, and other characteristics are all included in sociodemographic data. These factors which include marital status, and ethnicity offer vital insights into the dynamics and makeup of society. The sociodemographic information is very important from research perspective. igure.1 gender wise frequency Leukaemia Patients

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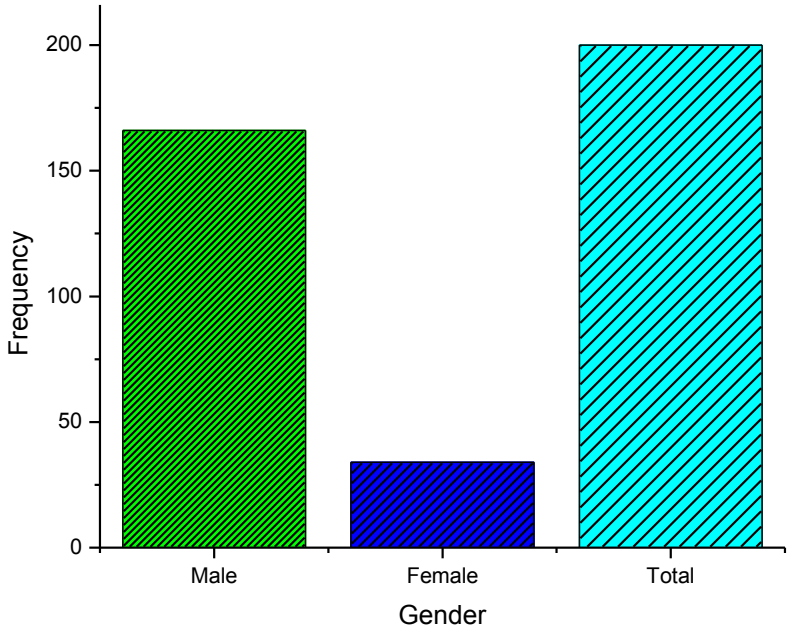


There were 166 male patients, 83% of whom were male. 17% of all patients are female, with 34 being female. Statistics show that there is a significant gender disparity in the patient group being studied. Male patients account for 83% of the total, with female patients making up for 17%.

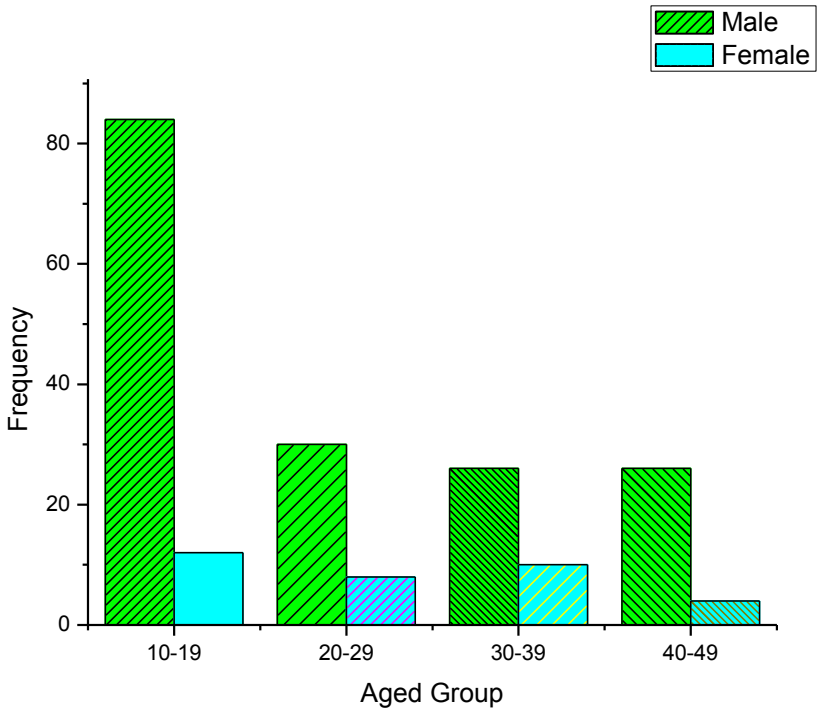
Figure 1. Gender of Patients with Leukaemia

The significant gender disparity in the patient population is an important factor to consider in healthcare analysis and treatments. This imbalance of gender shows more trend of disease in males.

4.2.1.1 Age Distribution of Patients:

The representation of people in a population across different age groups is referred to as age distribution. It's a statistical metric that shows the share or percentage of individuals in various age groups. Comprehending the age distribution of a population is essential for sociological, economic, and public health evaluations, as it offers valuable insights into its makeup and dynamics. The distribution of people within particular age phases may be determined with the use of the age breakdown, which also makes it easier to analyze patterns and trends within various age groups. *Table 1- Age Distribution of Patients with Leukaemia*

Figure.2



There are 48 patients aged 10 to 19, including 6 females (12.5%) and 42 men (87.5%). There are 19 patients aged 20 to 29, including 4 females (21.1%) and 15 men (78.9%). In the 30 to 39 age range, there are 18 patients: 5 females (27.8%) and 13 men (72.2%). There are 15 patients aged 40 and over, including 2 females (13.3%) and 13 men (86.7%). Gender distribution varies throughout age categories, according to data. The observed variance in gender distribution between age groups emphasizes the significance of age-related issues in healthcare planning and analysis. The gap in the 10-19 age range, with 87.5% males and 12.5% females, shows gender-specific health trends or impacts. In contrast, the 30-39 age group has a more equal distribution, emphasizing the importance of complex healthcare methods that take into consideration both age and gender dynamics.

Figure 2- Age Distribution of Patients with Leukaemia

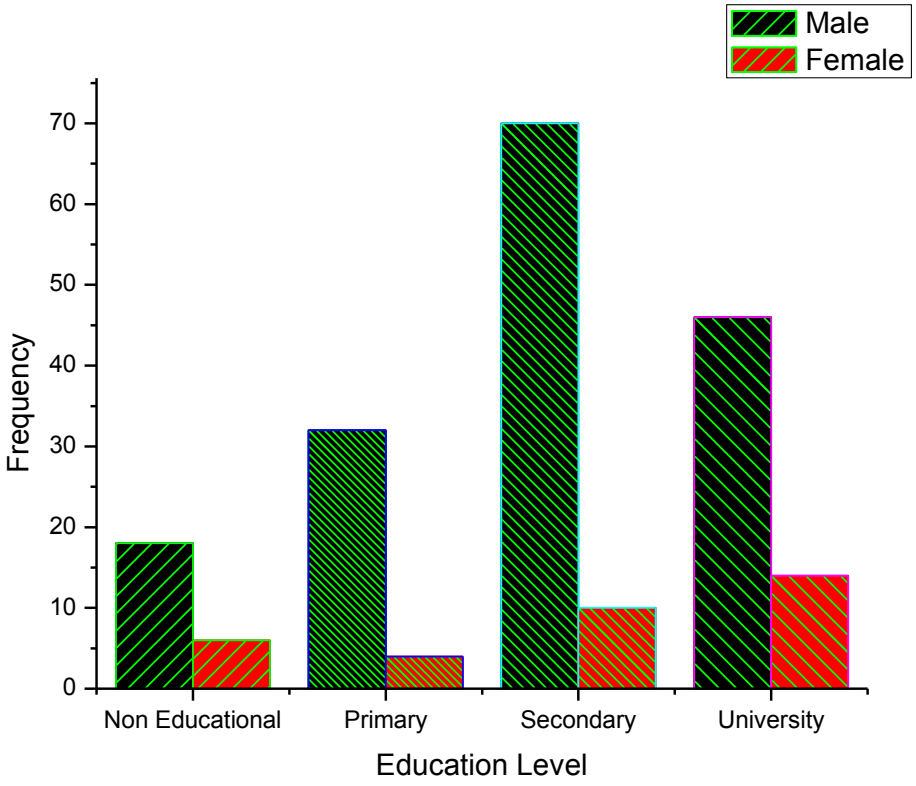
Different trends may be seen in the patient demographic distribution throughout age groups. There is a greater proportion of male patients in this age group—87.5% of the 48 patients between the ages of 10 and 19 are guys. A similar pattern is seen in the 20–29 age group, where men make up 78.9% of patients. It's interesting to note that, contrary to the previously noted gender distribution, there is a discernible rise in the percentage of female patients in the 30- to 39-year-old age range—27.8%. Once again, 86.7% of patients who are 40 years of age and older are male. These results highlight the need of taking age-specific differences in demographic trends into account when addressing healthcare needs and creating gender- and age-specific tailored treatments.

4.2.1.2 Educational Status of Patients:

Analysing the patients' educational backgrounds in the study sheds light on their health literacy and how well they comprehend and use medical information. A complete picture of health disparities may be obtained by considering the influence of education on socioeconomic

position, health behaviors, and access to healthcare services. Gaining insight into educational backgrounds helps with focused health promotion campaigns, treatment adherence, and intervention customization. This variable adds complexity to the study, addressing the complex effects of education on health outcomes and advancing a more sophisticated comprehension of patient well-being.

Table 2- Education Status of Patients with LeukaemiaFig.3 Educational status



The non-educated group includes 12 patients, or 12% of the total number of patients. Eighteen patients, or 18% of the total patient group, had only finished elementary school. Forty patients have completed secondary education, accounting for 40% of the overall patient population. There are 30 patients who have completed their university degree, accounting for 30% of the overall patient population. The distribution of patient education reflects the population's diverse educational backgrounds. 40% of the patients completed high school, indicating that a large portion of the population has at least a basic level of formal education. Potential associations between education and health outcomes can be investigated due to the distribution of non-educated, primary school, and university-educated populations, implying a range of educational attainment levels.

Figure 3. Distribution of Male and Female Patients by Education Status

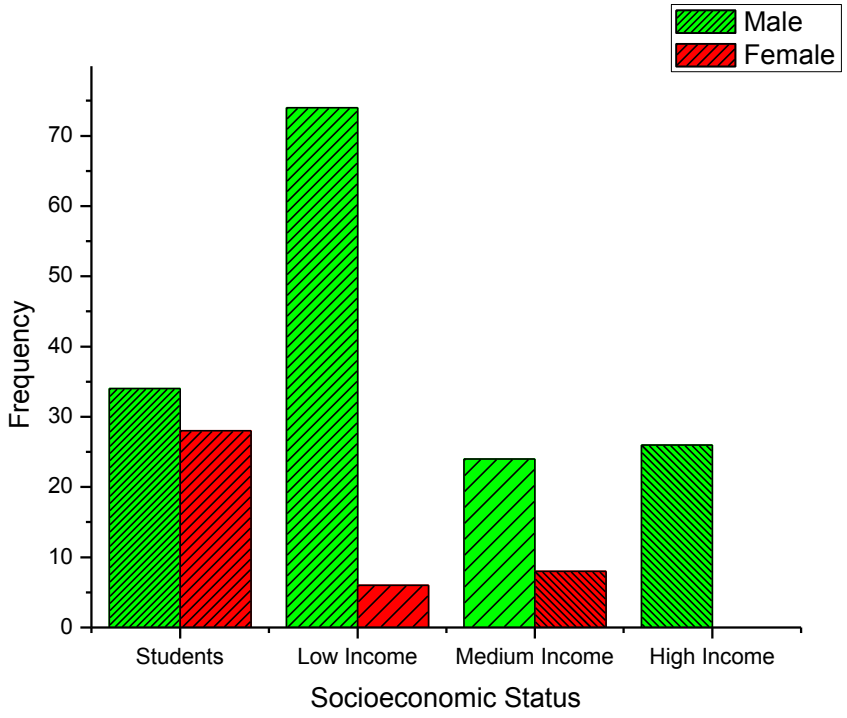
Understanding this distribution gave insights into potential socioeconomic determinants of health in the patient population, as education level and socioeconomic status are typically linked.

4.2.1.3 Occupation of Patients:

A more nuanced view of health determinants may be obtained by include patients' employment in your research, since this can provide important insights into their daily routines, work settings, and possible occupational dangers. The creation of focused treatments can be facilitated by the effect that a person's occupation has on stress levels, health behaviors, and access to healthcare services.

Table 3- Occupation of Patients

Figure.4 Socioeconomic status



Comprehending the professional milieu of patients enables customized healthcare approaches that take into account the distinct requisites and hazards linked with diverse vocations. The validity of the research is increased by the inclusion of occupational data in a thorough examination of the socioeconomic determinants influencing health outcomes. The data depicts the distribution of patients depending on both employment/student status and gender. The Student/Unemployed/Household category has 31 patients, or 31% of the total patient population. There are 17 males (54.8% in this group) and 14 women (45.2%). 40 patients fell under the low-level employee category, accounting for 40% of all patients. Three of them are women (7.5% of the group), while 37 are men (92.5%). The Medium-Level employee group has 16 patients, or 16% of the total number of patients. 12 of them (75%) are men, while 4 (25%) are women. 13 people, or 13% of the whole patient population, fell into the high-level Employee category. This group has 13 male patients. The data reveals how patients are dispersed according on gender, occupational status, and educational achievement. 40% of patients fall into the "Low-Level Employee" category, which includes a substantial number of male patients (92.5%).

Figure 4- Occupation of Patients

13 people, or 13% of the whole patient population, fell into the high-level Employee category. This group has 13 male patients. The data reveals how patients are dispersed according on

gender, occupational status, and educational achievement. 40% of patients fall into the "Low-Level Employee" category, which includes a substantial number of male patients (92.5%). With a reasonably equal gender distribution, the "Student/Unemployed/Household" category also makes up a sizable portion (31%) of the patient population. In the patient population, the groupings of "Medium-Level Employee" and "High-Level Employee" are less common but still substantial. Patient distribution may fluctuate depending on work level, as seen by statistics showing that more male patients fall into the "Low-Level Employee" category. In order to meet the unique demands of various work groups, healthcare planning and resource allocation can be informed by an understanding of the occupational distribution. Examining the relationships between employment status and socioeconomic position can shed light on the larger social determinants of health.

RESEARCH OBJECTIVE:

- **To assess nutritional status of Leukaemia Patients.**

4.2.2 HEALTH STATUS OF PATIENTS:

One of the most important metrics in the study is the Body Mass Index (BMI) which indicates the health state of individuals. Based on a combination of height and weight, BMI divides people into four categories: underweight, normal weight, overweight, and obese. Knowing BMI helps with public health interventions, treatment planning, and health risk assessment.

Table 4- Health Status of Patients

HEALTH STATUS	BMI	Number of patients (n)		Percent (%)	
AGE 10-19					
UNDER WEIGHT	Below 5%	44	Male 39	44	Male 39
			Female 5		Female 5
NORMAL WEIGHT	5%-85%	3	Male 2	3	Male 2
			Female 1		Female 1
OVERWEIGHT	85%-95%	0	Male 0	0	Male 0
			Female 0		Female 0
OBESE	Greater than 95%	0	Male 0	0	Male 0
			Female 0		Female 0
AGE 19+					
UNDER WEIGHT	Less than 18.5	35	Male 27	35	Male 27
			Female 8		Female 8
NORMAL WEIGHT	18.5-24.9	18	Male 15	18	Male 15
			Female 3		Female 3
OVERWEIGHT	25-29.9	0	Male 0	0	Male 0
			Female 0		Female 0
OBESE	30 or greater	0	Male 0	0	Male 0
			Female 0		Female 0

The data show how patients are distributed according on their health state, BMI category, and age group. There are 44 individuals classified as underweight, with the majority falling between the ages of 10 and 19. 39 of them are boys (88.64% underweight), while 5 are girls (11.36% underweight). There are three patients in the normal weight range. Two of them are male (66.67% of normal weight), while one is female (33.33% of normal weight). There are no overweight patients in this age group. There are no obese patients aged 10 to 19 years. There are 35 underweight patients among those aged 19 and up. 27 of them are boys (77.14% underweight), while 8 are girls (22.86% underweight). There are 18 patients in the normal weight

range. Among them, 15 are men (83.33% of normal weight) and 3 are women (16.67% of normal weight). There are no overweight patients in this age group. There are no obese patients in this age group. The majority of patients in both age categories are underweight, particularly those aged 10 to 19. The distribution of BMI categories shows a larger frequency of underweight people, particularly males. The lack of patients in the overweight and obese categories might be unique to this sample or demographic. The interpretation emphasizes the need of evaluating BMI in different age groups, as well as potential health risks associated with being underweight.

CONCLUSION

A major health concern is the growth in cancer incidence worldwide, especially paediatric cancer, which is expected to reach 21.4 million new cases by 2030. Given its effect on blood cells and risk for death, leukemia—which is characterized by unchecked cell proliferation—especially Chronic Lymphocytic Leukaemia (CLL)—demands attention. The fact that pancytopenia is a frequent hematologic ailment in leukaemia highlights how complicated this illness is. In leukaemia patients, chronic nausea and vomiting can worsen malnutrition during cancer therapy, increasing morbidity and decreasing survival chances. The results of the FFQ provided insight into the significant decrease in food consumption among chemotherapy patients, with a clear lack of animal protein. The majority's inconsistent meat intake habits and rare chicken eating highlight the dietary difficulties they have while undergoing therapy. The significance of individualized nutritional assistance is further highlighted by the inadequate intake of important dietary categories. Essentially, tackling the many issues raised by leukaemia requires an all-encompassing strategy that includes increased access to treatment, dietary modifications, and international initiatives to close the gap in healthcare. Globally, targeted measures for leukaemia patients should focus on improving nutritional assistance, particularly during chemotherapy, in order to enhance overall results and quality of life.

RECOMMENDATIONS

Provide leukaemia patients receiving chemotherapy with specialized dietary support programs designed to address the unique difficulties associated with nausea and vomiting. In order to reduce malnutrition and improve patients' general nutritional condition, these programs should concentrate on offering meals that are high in nutrients and are readily digested. Create educational programs to educate leukaemia patients, their families, and medical professionals on the value of eating a healthy diet while undergoing treatment. Stress the importance of diet in preventing side effects from therapy and enhancing general health. Make addressing infection risks, malnutrition, and inadequate supportive care a top priority in order to improve outcomes and close the gap in healthcare. Give leukaemia patients individualized dietary counselling that takes into account their preferences, cultural background, and unique treatment-related issues. This can enable patients to maintain their nutritional well-being throughout their treatment journey, control side effects, and make educated food decisions. For leukaemia patients, establish routine monitoring of their body mass index (BMI) and nutritional condition. Promote more investigation on the relationship between dietary consumption and leukaemia patients' treatment results. Further research will advance our knowledge of how diet affects the course of disease and may result in better treatments and better results for patients.

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