

Original article

# Nutritionist's Role in Dietary Management of Patients with Cancer

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## ARTICLE INFO

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## ABSTRACT

This study is to know the effect of appropriate nutrition on developing the health of children with cancer during their treatment. Also, it is to investigate personal dietary counseling by a nutritionist to maintain body weight, and to prevent malnutrition compared to standard medical care. A cross-sectional study was conducted on 100 children with cancer aged from 1 to 15 years in Tripoli, Libya from 1 March to 30 August, 2023. The cross-sectional study also involved 100 parents of children with cancer aged from 23 to 68 years old. Results showed that about 51% of cases had leukemia and 70 % of cancers were hereditary. Most cases in stage II (47%) and 44% of cases underwent chemotherapy dose treatment. Before treatment, 20% of children with cancer had normal BMI and 40% were underweight. But, 49% of children with cancer gained weight after treatment and they ate hospital diet. There was a slight increase in the values of BMI before and after treatments. The values of the BMI measurements before and after cancer treatment were a statistically significant different ( $P=0.047$ ). Endpoints were weight loss before treatment, Low BMI and malnutrition. Consequently, early and intensive individualized dietary counseling by a nutritionist help promoting healthy weight.

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## INTRODUCTION

Cancer is reported as the second leading cause of death in developed countries including Libya. It enlarged from 7.6 million cases in 2008 to 8.2 million cases in 2012 [1,2]. In Libya, there is a need to pay attention for increasing cancer cases. Malnutrition is a big concern in children diagnosed with cancer. The risk of nutritional impairment increases during cancer initiation, prognosis, and treatment. The most common treatments include surgery, radiation therapy, chemotherapy, or a combination of these treatments [3,4]. This indicates that more information is needed for healthcare administrations, screening, and early treatment to improve cancer avoidance [5]. Cancer may cause serious misfortune of incline muscle mass, weight loss, and lack of healthy nourishment. These impacts lead to poor nourishment, long use of medical supplements and expanded catabolism [4-6]. The degree of these impacts can change largely from smooth responses to unusual shapes of deficiency [6,7].

Nourishment is essential to guarantee health development, adjusted body composition and long last wellbeing support. However, failure getting the required nourishment and supplements may lead to anomalous body composition and sickness. On the other hand, diet provides over calories may lead to obesity and expanded fat mass which may cause dismalness and mortality. Also, modification of body composition during cancer treatment may result in enlarged disease, organ brokenness, changed pharmacokinetics, poor life quality and comorbidities [6,8].

Children diagnosed with cancer mostly have ailing health. The ailing health happens due to numerous components such as tumor category and concentrated treatment, as well as the socio-economic status of the family [6,7,9]. Children diagnosed with cancer are at big risk when they have short-term and long-term health problems. This is related to their fundamental malady and side effects of medications. Nutritional status can affect a few clinical consequences such as general persistence, treatment resilience, chance of creating diseases and quality of life [7,10]. Moreover, weak health could be a condition of insufficient nutritious status. It is also a result of an awkwardness among the energy, supplements given and required nutrients. The World Health Organization (WHO) is classified children diagnosed with cancer into under nutrition and over nourishment. Lack of healthy sustenance is classically expressed as deep ailing health or extravagant [7].

The objectives of this work are to know the role of proper nutrition in improving the health and to understand nutritional status changes in children during cancer treatment. As well as, it is to study dietary advises by a nutritionist for better maintain of body weight and to prevent malnutrition compared to standard medical care.

## METHODS

### *Study design*

The cross-sectional study was conducted on 100 children with cancer aged from 1 to 15 years. 100 parents aged from 23 to 68 years were answered the questions related to nutritional status of their children with cancer. The interview was performed from 1 March to 30 August, 2023 in Tripoli Medical Hospital, Tripoli, Libya.

### *Data collection*

Data was collected by qualified nutritionists. A detailed questionnaire form was used to collect information about the nutritional status of children with cancer and to detect role of nutritionist in improving body health. The interview was to collect data about socioeconomic characteristics, dietary information, and anthropometric measurements. The questions were about age, gender, type of cancer, type of cancer treatment, people providing care and nutrition advises. Participants were also asked whether they prescribed a special cancer diet. Also, Height and weight were measured to calculate body mass index (BMI). The average amount of nutrients for the 3-day recall was calculated. Anthropometric measurements were performed using standard techniques recommended by the World Health Organization (WHO) [8,11].

### *Statistical Analyses*

Descriptive analysis was performed using SPSS version 24. Chi Square was used to test the association between two qualitative variables. The significance level was set at  $p$  value  $< 0.05$ . Independent t-test was used to compare between qualitative and quantitative variables. A bivariate correlation was carried out to test the relationships between quantitative variables.

## RESULTS

### *General Characteristics*

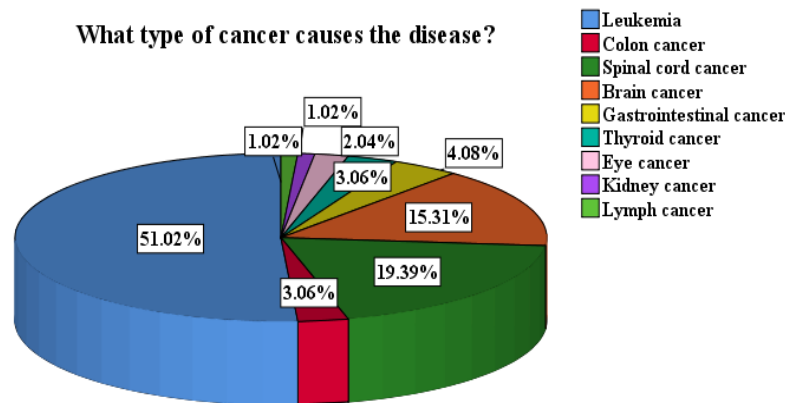
About 100 children were diagnosed with cancer. Of 100 children with cancer, 59 cases were males and 41 cases were females (Table 1). 50% of cases aged from 1 and 5 years old. In this study, most parents were educated (91%) and had low-income level (less than 1000 LYD) (90%).

### *Medical History*

From analyzed data, 51 % of the children diagnosed with cancer had leukemia, followed by spinal cord cancer (19.4%) and brain cancer (15.3%), whereas 14.3% of cases had gastrointestinal, thyroid, eye, kidney, colon, and lymph cancers (Figure 1). Also, the study found that most children had cancer (70%) due to genetic causes, while 27% of cases were due to immunodeficiency (27%). The lower percentage of cancer incidence was because of wrong medication use (3%).

**Table 1. Characteristics of Children with Cancer.**

Characteristics	Percent %
<b>Genders</b>	
Male	59
Female	41
<b>Age</b>	
1 – 5 Years	50
5 – 10 Years	32
10 – 15 Years	18
<b>Parents' Educational Level?</b>	
Educated	91
Uneducated	9
<b>Monthly Income</b>	
Less than 1000 dinars	90
From 1500 - 2000 dinars	7
More than 2000 dinars	3



**Figure 1. Types of Cancer in Children Aged 1 to 15 Years Old**

Results showed that majority of cases were in stage II (47%), while most patients received chemotherapy for cancer treatment (44%) (Table 2).

**Table 2. Medical History of Children with Cancer.**

Questions	Percent %
<b>The Cause of Cancer?</b>	
Hereditary	70
Immunodeficiency	27
Wrong Medications	3
<b>Stages of the Disease?</b>	
Stage I	21
Stage II	47
Stage III	17
Stage VI	15
<b>What type of treatment is used?</b>	
Surgery and Tumor Excision	16
Chemotherapy	44
Drug Therapy	16
Chemotherapy + Drug Therapy	16
Surgery and Tumor Excision + Chemotherapy	3
Surgery and Tumor Excision + Chemotherapy + Drug Therapy	3
Surgery and Tumor Excision + Drug Therapy	2

### **Nutritional Status and Anthropometric Measurements**

The average calorie intake of children with cancers in Tripoli Medical Hospital was from 780 – 5100. The values of

mean and standard deviation were 2157.98 and 1116.4389, respectively. According to source of diet prescription based on standard medical care for patients with cancer in Tripoli Medical Hospital, 50 % of children with cancer had severely malnourished, followed by risk to malnutrition (30%) and well nourished (20%). It was observed that cancer cases received their special diet counseling from dietitians had better nutritional status than those who receive standard medical care and take their advices from physicians. Table 3 explained the average ratio of BMI measurements of children before and after cancer treatment. Before cancer treatment.

**Table 3. Average Ratio of BMI Measurements before and after Treatment.**

BMI	BMI measurement before treatment (n, %)	BMI measurement after treatment (n, %)	P value
<b>Under 18 kg/m<sup>2</sup></b>	40 (40%)	30 (30%)	0.047
<b>18-24 kg/m<sup>2</sup>(normal)</b>	20 (20%)	45 (49%)	
<b>24-35kg/m<sup>2</sup>(overweight, obese)</b>	20 (20%)	15 (15%)	
<b>35-45 kg/m<sup>2</sup>(morbid obese)</b>	20 (20%)	10(10%)	

## DISCUSSION

Nutritional support consulting for patients with cancer often includes recommendations and diet planning to increase energy intake [13,14]. However, malnutrition is associated with higher mortality rates and poor life quality among patients with cancer [15, 16]. Consequently, it is essential to control weight loss and malnutrition for patients with cancer by maintaining an efficient nutritional status [17]. Thus, this study tried to demonstrate the beneficial effect of diet prescribed by nutritionists on BMI measurements to detect malnutrition in children with cancer rather than standard medical care only. The results indicated that the role of the nutritionist was significantly important in maintaining and improving weight loss and malnutrition of children with cancer.

One important finding that 50% of cancer incidence were in children aged from 1 to 5 years. An earlier study explained that cancer was more common before age 5 years [18]. Likewise, a prior study by Chirande et al. (2021) reported that cancer incidence mostly occurred at the age of 5 years. This is consistent with what we found in this study. Furthermore, most parents (91%) were educated, but their standard of living was poor (income level less than 1000 LYD). This similar to a previous study found that cancer was more common in children who lived in low-resource settings [19].

Referring to medical history, 51% of children were diagnosed with leukemia and 70% of cancer causes were hereditary. Moreover, the majority of cases (47%) were in stage II and most cancer patients (44%) received chemotherapy dose for treatment. Hence, early and intensive dietary advising may reduce weight loss and malnutrition compared with standard medical care only. In clinical practice, children with cancer should receive regular and individualized dietary consultations during diagnosis, radiotherapy, chemotherapy and surgery [20,21]. Moreover, before cancer treatment, 20% of children with cancer had normal BMI and 40% of cases were underweight. But, after treatment, 49% of children with cancer had normal BMI and 30% of cases were underweight (Table 3). The results showed that there was statistically significant difference between BMI measurements of children with cancer before and after treatment ( $p$  value = 0.047). This explained that there was a slight increase in average values of BMI before and after treatment.

Data exhibited that children with cancer who ate a diet planned by a nutritionist had more positive development in their health than patients who took their advices from physicians. Similarly, a preceding study documented that good diet helped to improve health of cancer patients [20, 21]. However, other studies implied that children with cancer suffering from malnutrition dropped out of treatment and had lower survival rates than other children. An earlier study implied that 40.7% of children with cancer were malnourished, especially in early age [23].

## CONCLUSION

The study found that cancer incidence in children was in males more than females. There was high rate of malnutrition in children with cancer aged from 1 to 5 years who lived in low standard of living. Also, children with cancer who ate a diet planned by a nutritionist had more health improvement than patients who took their nutritional advices from physicians. Endpoints before treatment were weight loss, Low BMI measurements and malnutrition. Also, children with cancer who ate a healthy diet were considered more receptive to treatment than children who suffered from malnutrition. Consequently, early and intensive individualized dietary counseling by a nutritionist helped promoting healthy weight. In brief, the nutritionists can play important role in maintaining and improving weight loss and malnutrition of children with cancer. Further research needed to clarify the effect of malnutrition in children with cancer resulting from a low standard of living and how to prevent the incidence.

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### **Conflicts of Interest**

The authors state no conflicts of interest.

### **REFERENCES**

1. Abdel-Kader M, Hemeda H, Abdel-Hadi S, Zel-B R, El-Adgham N. Assessment of nutritional status of pediatric cancer patients. *J Egypt Pub Health Assoc.* 1996, 71(1-2):161-184.
2. Agarwal R K. Importance of optimal infant and young child feeding (IYCF) in achieving millennium development goals. *Indian Pediatr.* 2008, 45(1): 719–721.
3. Apprey C, Annan R A, Arthur F K, Boateng S K, Animah J. The assessment and prediction of malnutrition in children suffering from cancer in Ghana. *Pub Med.* 2014, 4(4):31-37.
4. Brinksma A, Huizinga G, Sulkers E, Kamps W, Roodbol P, Tissing W. Malnutrition in childhood cancer patients: a review on its prevalence and possible causes. *Critical reviews in oncology/hematology.* 2012, 83(2): 249-275.
5. Bosaeus I, Daneryd P, Svanberg E, Lundholm K. Dietary intake and resting energy expenditure in relation to weight loss in unselected cancer patients. *Intern J Cancer.* 2001;93(3):380-383.
6. Creutzig U, Zimmermann M, Hannemann J, Kraemer I, Herold R, Henze G. Quality management within the competence network of paediatric oncology and haematology. *Klinische Padiatrie.* 2003;215 (6):338-340.
7. Chirande L, Kazimoto T, Kaaya E. Late Presentation, Advanced Disease and Severe Acute Malnutrition are Common Among Children with Cancer in Tanzania. *TanzMed J.* 2021;32(2):93–103.
8. Kudubes A A, Bektas M. Nutrition in Pediatric Oncology Patients: A Systematic Review. *J Pediatr Res.* 2016;3(1):1.
9. Kesari A, Noel J Y. Nutritional Assessment. In StatPearls [Internet]. StatPearls Publishing. 2022.
10. Ladas E, Sacks N, Meacham L, Henry D, Enriquez L, Lowry G, Rogers P. A multidisciplinary review of nutrition considerations in the pediatric oncology population: a perspective from children's oncology group. *Nutri Clinic Pract.* 2005, 20(4):377-393.
11. Ladas E J, Gunter M, Huybrechts I, Barr R. A global strategy for building clinical capacity and advancing research in the context of malnutrition and cancer in children within low-and middle-income countries. *Jnci Monographs.* 2019;54(1): 149-151.
12. Meadows A, Friedman D, Neglia J, Mertens A, Donaldson S, Stovall M, Inskip P. Second neoplasms in survivors of childhood cancer: findings from the Childhood Cancer Survivor Study cohort. *J Clin Oncol.* 2009;27(14): 2356.
13. Mazess R, Hanson J, Payne R, Nord R, Wilson M. Axial and total-body bone densitometry using a narrow-angle fan-beam. *Osteo Intern.* 2000;11(1):158-166.
14. Raftery J, Young A, Stanton L, Milne, R, Cook A, Turner D, Davidson P. Clinical trial metadata: defining and extracting metadata on the design, conduct, results and costs of 125 randomised clinical trials funded by the National Institute for Health Research Health Technology Assessment programme. *Health Technol Assess.* 2015;19(11):1-166.
15. Orgel E, Mueske N, Sposto R, Gilsanz V, Freyer D, Mittelman S. Limitations of body mass index to assess body composition due to sarcopenic obesity during leukemia therapy. *Leuk & lymph.* 2018;59(1):138-145.
16. WHO Working Group. Use and interpretation of anthropometric indicators of nutritional status. *Bullet World health organiz.* 1986;64(6):929.
17. Pietsch J, Ford C. Children with cancer: measurements of nutritional status at diagnosis. *Nutrit ClinPract.* 2000;15(4):185-188.
18. Rickard K, Crosfeld J, Coates T, Weetman R, Baehner R. Advances in nutrition care of children with neoplastic diseases: a review of treatment, research, and application. *J Americ Dietet Assoc.* 1986;86(12):1666-1676.
19. Iniesta R, Paciarotti I, McKenzie J, Brougham M, Wilson D. Nutritional status of children and adolescents with cancer in Scotland: A prospective cohort study. *Clinic Nutri. ESPEN.* 2019;32(1): 96-106.
20. Sala A, Pencharz P, Barr R. Children, cancer, and nutrition—a dynamic triangle in review. *Cancer.* 2004;100(4):677-687.
21. Sala A, Rossi E, Antillon F, Molina A, De Maselli T, Bonilla M, Barr R. Nutritional status at diagnosis is related to clinical outcomes in children and adolescents with cancer: a perspective from Central America. *European J Cancer.* 2012;48(2):243-252.
22. Tisdale M. Cancer cachexia: metabolic alterations and clinical manifestations. *Nutri.* 1997;13(1):1-7.
23. Eys J. Malnutrition in children with cancer. Incidence and consequence. *Cancer.* 1997;43(S5):2030-2035.

## دور أخصائي التغذية في إدارة النظام الغذائي لمرضى السرطان

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### المستخلص

تهدف هذه الدراسة إلى معرفة تأثير التغذية المناسبة على تطوير صحة الأطفال المصابين بالسرطان أثناء علاجهم. كما تهدف إلى التحقيق في الاستشارة الغذائية الشخصية من قبل أخصائي التغذية للحفاظ على وزن الجسم. ومنع سوء التغذية مقارنة بالرعاية الطبية القياسية. أجريت دراسة مقطعية على 100 طفل مصاب بالسرطان تتراوح أعمارهم بين 1 إلى 15 عامًا في طرابلس، ليبيا من 1 مارس إلى 30 أغسطس 2023. كما شملت الدراسة المقطعية 100 والد لأطفال مصابين بالسرطان تتراوح أعمارهم بين 23 و 68 عامًا. أظهرت النتائج أن حوالي 51٪ من الحالات مصابة بسرطان الدم وأن 70٪ من السرطانات وراثية. خضعت معظم الحالات في المرحلة الثانية (47٪) و 44٪ من الحالات لعلاج جراحات العلاج الكيميائي. قبل العلاج، كان لدى 20٪ من الأطفال المصابين بالسرطان مؤشر كتلة الجسم طبيعي وكان 40٪ يعانون من نقص الوزن. لكن 49٪ من الأطفال المصابين بالسرطان اكتسبوا وزناً بعد العلاج وأكلوا نظاماً غذائياً في المستشفى. كانت هناك زيادة طفيفة في قيم مؤشر كتلة الجسم قبل وبعد العلاج. كانت قيم قياسات مؤشر كتلة الجسم قبل وبعد علاج السرطان مختلفة إحصائياً بشكل كبير. ( $P = 0.047$ ) كانت النقاط النهائية هي فقدان الوزن قبل العلاج وانخفاض مؤشر كتلة الجسم وسوء التغذية. وبالتالي، فإن الاستشارة الغذائية الفردية المبكرة والمكثفة من قبل أخصائي التغذية تساعد في تعزيز الوزن الصحي.

**الكلمات المفتاحية:** أخصائي التغذية، الحالة الغذائية، الأطفال المصابون بالسرطان، طرابلس