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The Impact of Chemotherapy on Dietary Status as Well as Life Quality in Kids with Cancer in Belgium

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Abstract

Purpose: The purpose of this study was to evaluate the impact of chemotherapy on dietary status as well as life quality in kids with cancer in Belgium.

Methodology: The study used a desktop literature review methodology (desk study). This required a thorough analysis of research on the impact of chemotherapy on dietary status as well as life quality in kids with cancer. The subject of the study underwent three phases of sorting in order to assess its suitability for further study.

Findings: This study concluded that chemotherapy was associated with poor dietary status and reduction in the life quality ratings. The use of the Nutrition Impact Symptom (NIS) checklist in the kid's oncology clinic/ward triggers more therapeutic interventions. The awareness for NIS will likely evoke more research in assessment, impact, and treatment.

Unique Contribution to Theory, Practice and Policy: This study recommended that individual's food preferences and aversions should be considered and combinations of oral, enteral and parenteral diet be provided. In view of the findings, the study recommends that dietetics should frequently carry out diet assessments in order to provide proper management to curb malnutrition.

Keywords: *Chemotherapy, Dietary Status, Life Quality, Kids, Cancer.*

INTRODUCTION

A significant public health issue in the United States and many other countries is cancer, particularly children cancer. Currently, cancer is the primary cause of death in the United States (Jemal *et al*., 2020). According to estimates, cancer claims the lives of about 7.9 million people yearly, accounting for 13% of all global fatalities and 14 million new cases (WHO, 2015). In affluent nations, childhood cancer is a major cause of child mortality. It is also a known cause of malnutrition and death in poorer nations, especially among those with low socioeconomic level (Chukwu *et al*., 2016). Reduce the global under-5 Mortality Rate by 2/3 by 2015 is one of the 1990-described Millennium Development Goals (UNICEF, 2018).

Malnutrition affects many hospitalized patients often (Schoeman *et al*., 2022). Cancer patients experience protein energy deficiency as their illness progresses, with increased basal energy needs as a result of their underlying condition and decreased oral intake as a result of diminished gustatory senses (Schoeman *et al*., 2020). Adequate nutrition during cancer therapy is crucial for clinical outcome measurements like treatment response, life quality, and healthcare costs (Khalil *et al*., 2015). Although the two must work in tandem, the majority of cancer children typically receive greater emphasis on medical care than food management (Bauer *et al*., 2021).

Diet impact symptoms (NIS), which appear to arise frequently in clinical treatment, can be understood as the wide range of barriers to oral dietary intake (Kubrak *et al*., 2020). Many of these symptoms are brought on by side effects of advanced cancer, anticancer medication, or co-morbid conditions (Blum et al., 2021). Anorexia, taste alterations, dysphagia, nausea, vomiting, and diarrhea are a few of these adverse effects that could further impair one's capacity to function and eat (Kubrak *et al*., 2020; Mosby *et al*., 2019; Omlin *et al*., 2015). Many of these symptoms, including anorexia-cachexia, dysphagia, and delirium, could hinder oral intake while also causing refractory cachexia, which would result in ongoing weight loss and a lower quality of life (Hui *et al*., 2015). Although they have an effect on oral dietary intake, they have rarely been thoroughly evaluated (Omlin *et al*., 2015)

In cancer patients, malnutrition has been linked to a higher risk of a prolonged hospital stay (LoS) and a lower quality of life (QoL) (Nourissat *et al*., 2018). All cancer patients are affected by malnutrition globally because it raises the risk of infection, slows the healing of wounds, increases the toxicity of treatments, lengthens hospital stays, and raises the expense of healthcare. Malnutrition is common among cancer patients, as has already been established, although its effects on patients' quality of life have not been sufficiently researched (Vergara *et al*., 2013).

Statement of the Problem

Given that the children's immunity is compromised and they are unable to successfully fight the disease, it has been discovered that placing less of an emphasis on nutrition therapy is linked to higher morbidity and infections (Matonya *et al*., 2020). A healthy diet during cancer treatment is crucial for clinical outcome measurements like treatment response, life quality, and medical expense. The significance of nutrition in children and young people with malignancies is still undervalued, according to a recent assessment of crucial aspects of diet in children with cancer (Nieuwoudt, 2021; Brinksma *et al*., 2022). Studies are required to confirm the need of managing a child's food properly when they have cancer. Determining the dietary status of children with

cancer and the frequency of diet-related symptoms following the start of chemotherapy, as well as their quality of life, are the goals of this study.

Cancer is currently the second-leading cause of death in Belgium, but experts predict that it won't be long until it overtakes all other diseases. According to the World Health Organization (WHO), Belgium is going through an epidemiological change marked by a dual burden of communicable and non-communicable diseases, such as cancer. Belgium Children's cancer cannot be referred to as rare because national cancer registries show a 200 percent increase in pediatric cancer cases and a sizable number being detected and treated in other facilities.

Objectives of the Study

The general objective of the study is to assess dietary status, the prevalence of diet- impact symptoms, their life quality and the association that exist between dietary status and life quality of kids cancer patients undergoing chemotherapy in Belgium**.**

Significance of the Study

In order to appropriately manage cancers, it is crucial that children, their service providers, doctors, and medical officers understand the effects of chemotherapy on food status. This is due to the rising incidence of juvenile cancers. The survival rates will be significantly improved, and the morbidity and death linked to delayed diagnosis will be significantly decreased. The establishment of a diet support group in Belgium that will oversee diet screening and potential intervention among this particular group of patients will be strengthened by determining the prevalence of diet-impact symptoms among children with cancer. The study's findings will also advance our understanding of diet and serve as a foundation for further investigation.

LITERATURE REVIEW

Dietary Status of Children with Cancer

Dietary status is a crucial factor in pediatric oncology. Malnutrition has been associated with higher morbidity and mortality rates in children with malignant disorders (Borges *et al*., 2020; Bauer *et al*., 2021; Monyeki *et al*., 2015). Malnutrition has been identified as a significant contributor to undesirable outcomes, such as higher morbidity and mortality rates and lower life quality (Farell *et al*., 2015). Weight loss in cancer patients has been found to be a sign of a poor prognosis. Adequate nutrition intake can improve the quality of life for cancer patients by helping them maintain their weight and body's diet stores, as well as by providing relief from diet-related illnesses (Bauer *et al*., 2021). Inadequate nutrient intake causes undereating and can raise the risk of infection and the occurrence and severity of treatment side effects, both of which lower the likelihood of survival (Steinbach *et al*., 2019; Malihi *et al*., 2015).

However, the significance of diet in children and young people with cancer is still undervalued. Adequate diet during cancer plays an essential influence in clinical outcome indicators, such as treatment response, life quality, and cost of care (Nieuwoudt, 2021; Khalil *et al*., 2015). Additionally, it has been demonstrated that the food support shortens the time needed for bone marrow recovery, indicating that it may lessen the toxicity brought on by chemotherapy (Linga et al., 2022). Depending on the diagnosis and the malnutrition criteria employed, between 5 and 50

percent of children and young adults with cancer exhibit malnutrition upon diagnosis (Bauer *et al*., 2021). Due to their increased substrate requirements from the sickness, their therapy, and their lower reserves, children are more susceptible to malnutrition than adults. In order to achieve proper growth and development, youngsters also need more energy and nutrients (Bauer *et al*., 2021; Nieuwoudit, 2021; Khalili *et al*., 2015).

Chemotherapy Treatment

Chemotherapy (CT) is a popular cancer treatment option that might have an impact on a patient's food habits. Since conventional chemotherapy treatments are nonspecific and attack both healthy and diseased cells, this result may be caused by the treatment's toxicity. Additionally, these drugs can have negative impacts on dietary status. Any of the following routes of administration are possible. Orally, intravenously, intra-arterially, intra-lesionally, intra-peritoneally, and topically via injection. The kind of chemotherapy employed depends on a number of variables, including the type and stage of the cancer (Raymond, 2017).

There are numerous negative effects of chemotherapy treatment for kids and teenagers (Adamsen & Moeller, 2016; Woodgate, 2018; Rodgersa *et al*., 2015). Alopecia, mucositis, skin issues, sleep issues, neurogical issues, nausea and vomiting, appetite loss, anorexia, pain, fatigue, bone marrow suppression (anemia, leukopenia, and thrombocytopenia), nausea and vomiting, pain, and fatigue are among the symptoms that are frequently reported during this treatment. The features of the medications determine the treatment-related side effect (Pound *et al*., 2022; Krull *et al*., 2015 & Rodgersa *et al*., 2015). These side effects can have a negative influence on the physical and psychological well-being of cancer patients (Savage *et al*., 2018; Kaleyias *et al*., 2022). Additionally, the inability to eat or drink as well as changes in one's body image can cause mental anguish in both patients and caretakers (Hui *et al*., 2015).

Some anti-cancer medications disrupt the division of cancer cells or enzyme reactions. They destroy certain healthy cells and weaken resistance to infection, which are major negative effects. Some cancers can be cured with chemotherapy. It is sometimes used to stop the spread of cancer to new organs or to limit the growth of cancer cells. Chemotherapy may be given after cancer has been surgically removed to prevent the disease from returning (adjuvant therapy). Primary [neo-adjuvant] chemotherapy is also useful in minimizing the size of the tumor before surgery (Bailey & Skinner, 2020). Chemotherapy can reduce the signs and symptoms of cancer, improving some patients' quality of life (Kubrak *et al*., 2019; Omlin *et al*., 2015).

Empirical Review

Wu *et al*. (2022), examined the moderated mediated effects of nutrition and physical activity between fatigues and quality of life in childhood cancer survivors. The aim of this study was to investigate the associations between nutrition, physical activity, fatigue, and quality of life (QoL) among childhood cancer survivors. The specific purpose was to examine whether nutrition mediated and physical activity moderated the relationship between fatigue and QoL in this population. A pooled sample of 120 childhood cancer survivors was recruited at pediatric oncology wards and ambulatory settings between August 2020 and May 2021. We collected data on participants' demographic characteristics, fatigue, nutritional status, physical activity, and QoL. The study then adapted Hayes Process Macro to examine the mediating and moderating effects of

nutrition and physical activity on the relationship between fatigue and QoL. In models adjusted for age and sex, (1) the simple mediation analysis identified the mediating effect of nutrition on the relationship between fatigue and QoL; and (2) the mediation and moderation analysis identified that the direct effect of nutrition between fatigue and QoL was significant when adding (a) physical activity and (b) fatigue × physical activity. There were significantly decreasing trends in physical activity at 1 standard deviation below the mean and at the mean, but not at 1 standard deviation above the mean. Our findings demonstrate that nutrition mediated and physical activity moderated the relationship between fatigue and QoL. This highlights an opportunity to enhance QoL among childhood cancer survivors through healthy lifestyle interventions. To ensure that future interventions address children's needs and promote the greatest impact, such interventions should include nutrition and physical activity components that involve nurses, pediatric oncology physicians, nutritionists, and physical therapists.

Pribnow *et al*. (2017), investigated the effects of malnutrition on treatment related morbidity and survival of children with cancer in Nicaragua. Most children with cancer live in resource-limited countries where malnutrition is often prevalent. The study identified the relationship between malnutrition and treatment-related morbidity (TRM), abandonment of therapy, and survival of children with cancer in Nicaragua to better inform targeted nutritional interventions. The study conducted a retrospective review of patients aged 6 months to 18 years with newly diagnosed acute lymphoblastic leukemia, acute myeloid leukemia (AML), Wilms tumor, Hodgkin lymphoma, or Burkitt lymphoma (BL) who were treated between January 1, 2004, and December 31, 2007 at Children's Hospital Manuel de Jesus Rivera in Managua, Nicaragua. Statistical analysis examined the relations among nutritional status and cancer type, risk category, TRM, and event-free survival (EFS). Sixty-seven percent of patients (189/282) were malnourished at diagnosis. Malnutrition was highest among patients with Wilms tumor (85.7%), BL (75%), and AML (74.3%). A total of 92.2% of patients (225/244) experienced morbidity during the first 90 days. Malnutrition was associated with severe infection ($P = 0.033$). Severely malnourished patients had ≥grade 3 TRM on more days ($P = 0.023$) and were more likely to experience severe TRM on >50% of days ($P = 0.032$; OR, 3.27 [95% CI, 1.05–10.16]). Malnourished patients had inferior median EFS (2.25 vs. 5.58 years; $P = 0.049$), and abandoned therapy more frequently ($P = 0.015$). In Nicaragua, pediatric oncology patients with malnutrition at diagnosis experienced increased TRM, abandoned therapy more frequently, and had inferior EFS. Standardized nutritional evaluation of patients with newly diagnosed cancer and targeted provision of nutritional support are essential to decrease TRM and improve outcomes.

Mantzorou *et al*. (2017), conducted a study on the clinical value of nutritional status in cancer. Malnutrition is a common finding in cancer patients, which can affect disease progression and survival. This review aims to critically summarize the prognostic role of nutritional status, from Body Mass Index (BMI) and weight loss to nutrition screening tools and biochemical indices, in cancer patients. According to the currently available data, Prognostic Nutritional Index (PNI) was a significant prognostic factor of patients' survival, both in univariate and multivariate analyses. Pre-operative albumin was also correlated with worse outcomes, being an independent prognostic factor of survival in several studies. BMI was also well-studied, with contradictory results. Although, lower BMI was found to be an independent prognostic factor of shorter survival in some studies, in others it did not have an impact on survival. In this aspect, this review highlights the

significant prognostic role of nutritional status in the disease progression and survival of cancer patients. Further, good-quality prospective studies are needed in order to draw precise conclusions on the prognostic role of specific nutritional assessment tools, and biochemical indices associated with the nutritional status in more cancer types, such as liver, breast and prostate cancer, and hematological malignancies.

Brinksma *et al*. 2015), conducted a study on how malnutrition ia associated with worse health-related quality of life in children with cancer. Malnutrition in childhood cancer patients has been associated with lower health-related quality of life (HRQOL). However, this association has never actually been tested. Therefore, we aimed to determine the association between nutritional status and HRQOL in children with cancer. In 104 children, aged 2–18 years and diagnosed with hematological, solid, or brain malignancies, nutritional status and HRQOL were assessed at diagnosis and at 3, 6, and 12 months using the child- and parent-report versions of the PedsQL 4.0 Generic scale and the PedsQL 3.0 Cancer Module. Scores on both scales range from 0 to 100. Undernourished children (body mass index (BMI) or fat-free mass < −2 standard deviation score (SDS)) reported significantly lower PedsQL scores compared with well-nourished children on the domains physical functioning (−13.3), social functioning (−7.0), cancer summary scale (−5.9), and nausea (−14.7). Over-nourished children (BMI or fat mass >2 SDS) reported lower scores on emotional (−8.0) and cognitive functioning (−9.2) and on the cancer summary scale (−6.6), whereas parent-report scores were lower on social functioning (−7.5). Weight loss (>0.5 SDS) was associated with lower scores on physical functioning (−13.9 child-report and −10.7 parent-report), emotional (−7.4) and social functioning (−6.0) (child-report), pain (−11.6), and nausea (−7.8) (parent-report). Parents reported worse social functioning and more pain in children with weight gain (>0.5 SDS) compared with children with stable weight status. Undernutrition and weight loss were associated with worse physical and social functioning, whereas over-nutrition and weight gain affected the emotional and social domains of HRQL. Interventions that improve nutritional status may contribute to enhanced health outcomes in children with cancer.

METHODOLOGY

The study adopted a desktop methodology. Desk research refers to secondary data or that which can be collected without fieldwork. Desk research is basically involved in collecting data from existing resources hence it is often considered a low-cost technique as compared to field research, as the main cost is involved in the executive's time, telephone charges and directories. Thus, the study relied on already published studies, reports and statistics. This secondary data was easily accessed through online journals and libraries.

FINDINGS

The results were grouped into various research gap categories namely as conceptual and contextual.

The significance of assessing the quality of life (QoL) of cancer patients has been recognized, as knowledge about it may affect decisions about selecting between alternative treatments or launching the proper intervention if QoL is deteriorating. However, the QoL of children with cancer has received little attention. The relationship between nutrition and life quality is still

underappreciated despite the correlation between lower overall wellbeing, morbidity, and dietary degradation.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study discovered that the disease's own effects, the use of cytotoxic medications which cause nausea, vomiting, and appetite loss that ultimately results in weight loss and protein energy deficiency could all be blamed for the low dietary status. The low frequency in the other studies may be attributable to better coordination of basic care and initiatives to increase access to medical facilities. Therefore, it can be inferred that programs aimed at improving food status among young cancer patients need to be scaled up.

When the respondents were undergoing chemotherapy treatment, the majority of their food intake was impacted, which resulted in appetite loss, vomiting, nausea, and mouth sores, demonstrating that their dietary status was impacted anytime they were receiving treatment. Dietary support will go a long way to boost response to treatment and reduce adverse effects of therapy.

Because of the patient's subpar general health status, the responders' quality of life was poor. The relevance of monitoring the QoL should not be understated because it can help with management changes and further enhance the quality of life for these children since an adequate diet during cancer plays a significant effect in various clinical outcome measures, including life quality.

Recommendations

To plan the optimal response and follow-up during cancer treatment and progression, it is essential to make all healthcare providers aware of the chance to early identify cancer patients at risk of malnutrition. Diet assessment should be performed regularly by clinical nutritionists, especially those caring for oncology patients, to identify those who are at nutritional risk.

Three-quarters (N=42, 80.77%) of the respondents in a recent study reported having a weak appetite, indicating the need for further research into the impact of chemotherapy on this issue. Intervention studies are also required to assess how improving dietary intake will be impacted by interventional care of NIS. It is important to perform more study to evaluate nurses' understanding of pediatric food issues, chemoterapy side effects, and management of those conditions. It is important to advise assessing the social, physical, and spiritual well-being of children with cancer and implementing the necessary care efforts to enhance their quality of life.

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