Effect of Nutritional Guidelines on Parents' Knowledge, Regarding Care Provided to their Children Receiving Chemotherapy at Zagazig University

Amal Mohamed El-Dakhakhny[1], Mervat Hisham[2], Bataa Mahmoud[3], Rania Elsaid Ali[4]

Abstract

Cancer a broad term that encompasses a wide range of diseases that affect region of body. Cancer defined the rapid growth of aberrant cells beyond normal borders, which subsequently infiltrate adjacent regions of the body and spread to organs, a process known as metastasizing. Metastases a leading cause cancer-related death. There numerous cancer treatment options Cancer is a generic term for a large group of diseases that can affect any part of the body.The aims of the current study were to Identify the effect of nutritional education guidelines on parents' knowledge, for their children receiving chemotherapy. Research Design: A quasi-experimental study design (pre, post and follow up) was used to evaluate effect of nutritional education guidelines on parents' knowledge, for their children receiving chemotherapy. Settings: The study was conducted in Pediatric Hematology and Oncology unit in pediatric hospital at Zagazig University Children Hospitals. one tool used; a Structured Interview Questionnaire sheet to collect data about characteristics of studied children's parents and their knowledge. The study results: illustrates a statistically significant difference in total mean score of knowledge among the studied children's parents pre and post the educational program (P=0.001). Before the program, total mean score of knowledge was 4.53±1.3 which increased to 9.83±2.8 at the post program phase, and declined to 9.21±1.6 at the follow-up phase. These improvements were statistically significant. It can be concluded that the guidelines had improved studied parents' knowledge about cancer nutrition for children receiving chemotherapy. Therefore, this study recommended that. using of innovative methods of health education in teaching all information about cancer and treatment as well as nutritional assessment methods to promote children's health.

KeyWords: Cancer,Chemotherapy, Nutrition.

DOI Number: 10.14704/nq.2022.20.9.NQ44561 **Neuro Quantology 2022; 20(9):4844-4853**

Correspondingauthor: Rania Elsaid Ali

Affiliations:[1]Professor of Pediatric Nursing, Faculty of Nursing, Zagazig University, Egypt; [2]Professor of Pediatric Medicine, Faculty of Medicine, Zagazig University, Egypt; [3]Lecturer of Pediatric Nursing, Faculty of Nursing, Zagazig University, Egypt; [4*]Specialist teaching of Pediatric Nursing,Zagazig Health Technical Institute, Egypt.

E-mail:bshrpeny@yahoo.com

Relevant conflicts of interest/financial disclosures:

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Introduction

Cancer is a large group of diseases that occur when abnormal cells divide rapidly and can spread to other tissue and organs. It is a genetic disease that is, it is caused by changes to genes that control the way our cell's function, especially how they grow and divide.Although the causes of cancer disease remain unknown, particularly those that occur during childhood **(Blaseg et al., 2014)**.Scientists believe that there are predisposing factors that produce cancer in children including; modifiable and non-modifiable factors. The modifiable factors (lifestyle factors) such as; exposure to smoke tobacco and excess body weight. While, non-modify able factors such as; inherited genetic mutations, hormones, and immune conditions. These predisposing factors may act simultaneously or sequentially initiating and/or promoting cancer growth in children **(Harif& Stefan, 2018).**

Staging describes the extent or spread of cancer at the time of diagnosis. Proper staging is essential for defining the optimizing therapy and assessing prognosis. For most cancers, stage is based on the size or extent of the primary tumor and whether the tumor has spread to nearby lymph nodes or other areas of the body. Moreover, a number of different staging systems are used to classify cancer for example system of summary staging is used for descriptive and statistical analysis of tumor registry data and is particularly useful for looking trends over time **(Plummer et al.,2016).** According to this system, if cancer cells are present only in the layer cells where the cancer developed and have not spread, the stage is in situ. If cancer cells have penetrated beyond the original layer of tissue, the cancer has become invasive and is categorized as local, regional, or distant based on the extent of spread **(Armstrong et al., 2018**). There are more than 100 types of cancer. Types of cancer are usually named for the organs or tissues where the cancers form. For example, lung cancer starts in the lung, and brain cancer starts in the brain. Cancers also may be described by the type of cell that formed them, such as an epithelial cell or a squamous cell. There are common types of cancer in children **(Huges et al.,2017).**

Leukemia is, a cancer of the bone marrow characterized by over production of abnormal white blood cells that range from very primitive and immature to nearly normal. The abnormal cells cannot defend the body against microorganisms and tissue injuries. They also decrease the production of normal red blood cells, white blood cells, and platelets, and infiltrate other organs as well **(Harif& Stefan, 2018).** Leukemia has three major effects; increased number of abnormal, immature leukocytes; accumulations of these cells within the lymph nodes, spleen, and other organs; and eventual infiltration of the malignant cells throughout the body. There are two types of leukemia, acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML). **(Cooper & Brown, 2015)** acute lymphoblastic leukemia (ALL) is a cancer of the white blood cells, characterized by the over production and continuous multiplication of malignant and immature white blood cells. It causes are unknown, and genetic factors may play a role. Acute lymphoblastic leukemia (ALL) is a malignant transformation and proliferation of lymphoid progenitor cells in the bone marrow, blood and extra medullary sites. While 80% of ALL occurs in children, it represents a devastating disease when it occurs in adults. The incidence of acute lymphoblastic leukemia is greatest between the age of 2 and 6 years, and is higher in boys. **(National cancer Institute ,2018).**

Significance of the study

Nutritional assessment is the systematic process of collecting and interpreting information, in order to, make decisions about the nature and cause of nutrition related health issues that affect an individual. Nutritional assessment includes; taking anthropometric measurements, collecting information about a child's medical history clinical and biochemical characteristics, dietary practices, current treatment and food security situation.

Rather more, dietary assessment methods provide valuable data to measure dietary exposure in nutritional epidemiology Aim of the study: This study aims to: Identify effect of nutritional guidelines on Parents' knowledge for their children Receiving Chemotherapy.

This aim will be fulfilled through the following objectives:

1-Assess the parents' knowledge regarding care provided to their children receiving chemotherapy.

2-Develop nutritional guidelines on Parents' knowledge regarding care provided to their children Receiving Chemotherapy.

3-Implement nutritional guidelines on Parents' nutritional guidelines on Parents' knowledge

regarding care provided to their children Receiving Chemotherapy.
4-Evaluate the effect of nutritional guidelines Parents' knowledge regarding care provided to their children Receiving Chemotherapy.

Research hypothesis:

Parents' knowledge, regarding nutrition care provided to children receiving chemotherapy will be improved after implantation of the guidelines.

Subject and Methodology

Research Design:

A quasi-experimental study design (pre, post and follow up) was used to evaluate effect of nutritional guidelines on parents' knowledge regarding careprovided to children receiving chemotherapy.

Settings:

The study was conducted in Pediatric Hematology and Oncology unit in pediatric hospital at Zagazig University Children Hospitals.

Study Subjects:

Two subjects were included in the study:

Group I: A convenient sample of all available parents of children (60) had cancer and receiving treatment in the study settings and agree to participate in the study.

Group II: purpose sample of all children who had cancer with the following inclusion criteria: a) Age between 6-12 years of age. b) Hospitalized during treatment, c) Treated for cancer for at least 1 month. D) Able to take oral nutrition. E) Free from any chronic disease.

Tools for data collection:

Three tools used for data collection:

Tool I:Structured Interview Questionnaire sheet:

Part A: Characteristics of the children and their parents, such as mothers age, mothers' education, mothers' job, marital status, father age, father education, fathers' job, income, residence and crowding index, child age, gender, the number of siblings of the child, child order and academic years.

Part B: Child's medical history such as, diagnosis, duration of illness in years, duration of treatment in months, number of hospital admission last years, number of days for hospital stay the last years, have a surgery, have a blood transfusion, causes of blood transfusion and having symptoms.

Part C: Parents knowledge about cancer, definition, at what age does cancer spread to children, types of cancers, causes of the cancer, primary signs that appear on a child with cancer, complications of cancer in children, precautions that must be taken to protect the child undergoing chemotherapy at home, how to prepare your child before the chemotherapy, how do you deal with your child during and after the chemotherapy, ways to treat cancer and purpose of chemotherapy.

Part D: Assessment of the child's eating or dietary habits from data collected for parents. It was concluded questions about the type of feeding, number of meals per day, regularly of meals times, regularly of breakfast eating, eating snacks between main meals, prepare special meals for child other than family, like eating certain foods, hate eating certain foods, eat with the family and eat in front of the TV.

Scoring system for knowledge:

All knowledge items were checked with a model key answer, where the complete correct response was scored (2) degrees, incomplete correct response was scored (1) degree and (0) for incorrect/don't know. The total knowledge Score was categorized into: - Poor (< 60%) - Average (60% -<75) - Good (>75).

Objectives of the guidelines:

1-Define childhood cancer its types, and clinical manifestations. 2-Know the predisposing factors of cancer, investigations and treatment. 3-Recognize the definition of chemotherapy treatment and its side effects. 4-Learn instructions concerning the preparation of the child before, during and after chemotherapy. 5-Learn information for nutrition and food preparation, during and after chemotherapy treatment.

Guidelines Contents:

The guidelines: were included five sessions. These sessions were involved definition of childhood cancer, its types, clinical manifestations, predisposing factors, investigations and treatment. It also was covered instructions concerning the preparation of the child before, during, and after chemotherapy, side effects of chemotherapy, and dietary assessment and information about foods and preparations for food intake. The educational program was developed through four phases as follows:

1-Assessment phase:

The nutritional training guidelines was constructed for the assessment of nutritional guidelines on parents' knowledge regarding care provided to children receiving chemotherapy, The assessment was performed before the implementation of training guidelines by interviewing each parent individually to assess their knowledge.

2- Planning phase:

Based on the results obtained from the interview questionnaire (from pilot and assessment phase) as well as reviewing the related literature the educational training guidelines was developed by the researcher. Detected needs, requirements and deficiencies were translated into aim and objectives of the educational training guidelines, The contents of the educational training guidelines were selected on the basis of identified needs. Teaching methods were selected to suit teaching in small groups in a form of lectures, group discussion, demonstration and. booklets and handout that covered theoretical information.

3- Implementation phase:

The guideline protocol on children receiving chemotherapy was developed based on actual needs assessment and implemented for parent. The implementation phase was achieved through five sessions at a period of 5 weeks (one session / week). Each session started by a summary of the previous session and objectives of the current session. Motivation and reinforcement were used during sessions to encourage parent' participation in the study. Demonstration and re-demonstration were applied to ensure complete practice. Parents were divided into groups and each group consisted of 6 parents to acquire the related program content. Each parent was supplemented with a copy of guideline education. The time of sessions ranged from 25-30 minutes. Different methods of teaching were used such as; discussion, lecture, brain storming, role play, demonstration and re-demonstration for each group. Media utilized were guideline education guided by an educational booklet and power point which were constructed by the researcher after reviewing the related literature about the research problem.

Tool validity and reliability:

Tool's validity was tested through a jury of three experts was pediatric nursing. The experts reviewed the tool for its clarity, relevance, comprehensiveness, simplicity, and applicability. Minor modifications were done in form of questions order and the terms used in formulation of questions. This phase took a period of one month from the beginning to the end April 2020.

Reliability:

Knowledge reliability statistics Cronbach's alpha = 0.810, Practice reliability statistics Cronbach's alpha = 0.852.

Ethical Considerations:

An official approval for conducting the study will be obtained from the responsible administrative personal at the study setting. A verbal consent will be obtained from patients for participation in the study. Ensuring complete privacy, total confidentiality of any obtained information will be ensured. Nature and aim of the study will be explained to each patient of participants.

A pilot study: was carried out on 10% of the total sample size (6 parents). It tested the validity, clarity, applicability, and feasibility of the study tools and the estimated time needed to complete each tool (I &II). Participants involved in the pilot study were not excluded from the study because Modifications were no done.

Field work:

The process of data collection was carried out from the beginning of March 2020 through October 2020. The researcher interviewed the parents at pediatric hematology and oncology clinic at Zagazig university pediatric hospital, explained the aim of the study and took oral approval from parents participating in the study prior to data collection by rotation for two or three days weekly during morning shift, to collect data by using previously mentioned tool. The data was collected through two phases for assessment of parents. The first phase was done prior to conducting the educational guideline to have base line of data and identify their actual educational need, while the second phase of assessment was done after conducting the educational guideline to evaluate the effect of education guideline of parents' knowledge regarding children receiving chemotherapy. The researcher interviewed each parent individually and explained the aim of the study and took their approval prior to data collection. Then, the researcher assessed parents' knowledge.

Evaluation phase:

During evaluation phase, the effect of the guideline education parents' knowledge toward children receiving chemotherapy was evaluated by using the same forms of tools used before the implementation for all parents. This was done immediately after the intervention and lasted 12 weeks (from the middle of May to middle of October 2020).

Statistical design:

The collected data was organized, coded, computerized, analyzed and tabulated by electronic computer and Statistical Package for Social Sciences (SPSS) version 20. The collected data was represented in term of number, percentage distribution, mean, standard deviation, relation coefficient Chi- square test and correlation. A significant level value was considered when $P > 0.05$ and $P \leq 0.00$.

Results

According to the current study Part(1) ***Table (1)*** shows that, the mean age of the studied children was 8.30±1.97 year. Related to gender, 66.7% of them were male. Regarding to academic year, 70.0% of the studied children were from Kg to three grades. As for the number of child's siblings, 90.0% of children were having three or more siblings, while 46.7% of them were the second between their siblings, the mean age of the studied children's mother was 33.73±4.06 year, while the mean age of the studied children's father was 40.37±2.97 year. Regarding parents' education, 66.7% of the studied children' mother had secondary education, while 40.0% of the studied children' father had secondary education. Regarding to parents' job, 73.3% of the studied children' mother was housewife, while 60.0% of the studied children' father was employee. Related to children's parent income level, 85.0% of them were having insufficient income. As for residence, 80.0 % of the children's parent were from rural area. According to crowding index, 63.3% of them were more than two. ***Table (2)*** shows that, the leukemia was the most common type of cancer (30.0%), followed by bone cancer (25.0%) among the studied children. Regarding the duration of illness and treatment, the mean duration of illness was 2.30 ±1.18 years, while the mean duration of treatment was 27.60 months±14.2.As for number of hospital admissions last year, 73.3% of the studied children admitted to hospital one time while, 20.0% of them admitted to hospital two times . Concerning to number of days for hospital stay the last year, 73.3% of the studied children stayed at hospital from month to two months while, 20.0% of them stayed at hospital for more than two months. Also, all the children hadn't any surgery (100.0%).Related to blood transfusion, 56.7% of studied children had blood transfusion, while 43.3% of them hadn't blood transfusion, and the main cause of blood transfusion was anemia (56.7%). Also, the table reveals that all the studied children had loss of appetite and tooth decay (100.0%), followed by dry mouth (96.7%), oral infection (93.3%), diarrhea and weight loss (90.0%), then nausea (73.3%). ***Table (3)*** reveals that 60.0 % of studied children's parents didn't know what the cancer is before the program while, after the program all of them (100.0%) knew what cancer is. Also, before the program 80.0% of studied children's parents didn't know at what age cancer spreads to children, while after the program 90.0% of them knew at what age cancer spreads to children. At the post program phase, there were statistically significant improvements in children's parents' knowledge ($p<0.001$). The follow-up phase showed some declines in studied children's parents' knowledge, but remained significantly higher compared with the pre-program levels and post program levels ($p<0.001$). ***Table (4)*** reveals that all the studied children's parents (100.0%) didn't know what the types of cancer are before the program while, after the program and at follow up stage this percentage decreased to be no one of them didn't knew what are the complications of cancer in children. Also, before the program all the studied children's parents (100.0%) didn't know what are the causes of cancer, while after the program this percentage decreased to be only 10.0% of them didn't knew what are the causes of cancer, then at the follow up stage this percentage increased to be (16.7%).Additionally, the table reveals that 36.7% of the studied children's parents didn't know what are the primary signs that appear on a child with cancer before the program while, after the program and at the follow up stage this percentage decreased to be no one of them didn't know what are the primary signs that appear on a child with cancer. These improvements were statistically significant ($p<0.001$).

Table (5) reveals that before the program, 71.7 % of the studied children's parents had poor knowledge about cancer, chemotherapy and its nutrition, while after the program and at follow up

stage this percentage decreased to be no one of them had poor knowledge about cancer, chemotherapy and its nutrition. Additionally, the table reveals that before the program only 3.3% of the studied children's parents had good knowledge about cancer, chemotherapy and its nutrition while after the program this percentage increased to be 70.0% of them had good knowledge about cancer, chemotherapy and its nutrition. These improvements were statistically significant (p<0.001).

Table 1. Demographic characteristics of the studied children and parents (N=60)

Demographic characteristics	(n=60)	
	Frequency	Percent
Age group: /year		
6-8	38	63.3
9-12	22	36.7
Mean ± SD	**8.30±1.97**	
(Range)	**(6-12)**	
Gender:		
Male	40	66.7
Female	20	33.3
The number of siblings of the child:		
Two	6	10.0
Three or more	54	90.0
The child's order among his siblings:		
The second	28	46.7
The third	22	36.7
The last	10	16.6
Academic year		
Kg to three grade	42	70.0
Fourth to six grade	18	30.0
Mother's Age group: /year	20	33.3
27 - 33	40	66.7
34 -40		
Mean ± SD	**33.73±4.06**	
(Range)	**(27-40)**	
Mother's Education:		
Not read & write	2	3.3
Read & write	18	30.0
Intermediate (secondary)	40	66.7
Mother's job		
Work [employee- free work]	16	26.7
House wife	44	73.3
Mother's marital status		
Married	48	80.0
Divorced	5	8.3
Widower	7	11.7
Father 's Age group: /year	32	53.4
35 - 40	28	46.6
41 - 45		
Mean ± SD	**40.37±2.97**	
(Range)	**(35-45)**	
Father's Education:		
Read & write	10	16.7
Primary	26	43.3
Intermediate (secondary)	24	40.0
Father 's job		
Work [employee]	36	60.0
Free work [farmer-tradesmen-driver]	24	40.0
Income:		
Sufficient	9	15.0
Insufficient	51	85.0

Table 2.medical history of the studied children (N=60)

Medical history	(n=60)	
	Frequency	Percent
Diagnosis:		
Leukemia	18	30.0
Neuroblastoma	13	21.7
Lymphoma	14	23.3
Bone cancer	15	25.0
Duration of illness in years:		
6 months to 2 years	30	50.0
3 – 4 years	30	50.0
Mean ± SD	**2.30 years ±1.18**	
(Range)	**(6 months- 4 years)**	
Duration of treatment in months:		
6 months to 24 months	30	50.0
25 – 48 months	30	50.0
Mean ± SD	**27.60 months±14.2**	
(Range)	**(6 months- 48 months)**	
Number of hospital admissions last year		
No time	4	6.7
One time	44	73.3
Two times	12	20.0
Number of days for hospital stay the last year[n=56]		
Month to two month	44	73.3
More than two months	12	20.0
Have a surgery:		
No	60	100.0
Have a blood transfusion :		
Yes	34	56.7
No	26	43.3
Causes of blood transfusion :		
Anemia	34	56.7
Having symptoms@:		
Loss of Appetite	60	100.0
Nausea	44	73.3
Problems With Chewing	16	26.7
Oral Infections	56	93.3
Diarrhea	54	90.0
Tooth decay	60	100.0
Dry Mouth	58	96.7
Vomiting	34	56.7
Difficulty Swallowing	42	70.0
Indigestion	36	60.0
Constipation	10	16.7
Weight Loss	54	90.0

(@) More than one choice was allowed

Table 3.children's parents' knowledge about cancer (N=60).

Items	Pre		Post		Follow up		(Cochran's Q test) p-value
	No	%	No	%	No	%	
What is cancer @							
a) Communicable	20	33.3	0	0.0	0	0.0	
b) Acute	0	0.0	0	0.0	0	0.0	
c) Chronic	24	40.0	60	100.0	60	100.0	
d) Can be controlled	0	0.0	52	86.7	50	83.3	
e) Recovered from it	0	0.0	10	16.7	8	13.3	(443.97)
f) Disturbances in the metabolic process, which result in an increase in the level of sugar in the blood in a way that exceeds the normal limit.	0	0.0	0	0.0	0	0.0	.000*
g) Do not know	36	60.0	0	0.0	0	0.0	
At what age does cancer spread to children @							
a) 1-5 years	0	0.0	0	0.0	0	0.0	
b) 5-10 years	0	0.0	0	0.0	0	0.0	
c) 10-15 years	0	0.0	0	0.0	0	0.0	(558.67)
d) All ages	12	20.0	54	90.0	54	90.0	
e) Do not know	48	80.0	6	10.0	6	10.0	.000**

(@) More than one choice was allowed *: Significant **: Highly significant

Table 4. Children's parents' knowledge about cancer (N=60)

Items	Pre		Post		Follow up		(Cochran's Q test) p-value
	No	%	No	%	No	%	
What are the types of cancer@							
a) Blood	0	0.0	54	90.0	34	56.7	(569.23) .000*
b) Brain	0	0.0	0	0.0	0	0.0	
c) Glands	0	0.0	0	0.0	0	0.0	
d) Skin & tissues	0	0.0	22	36.7	14	23.3	
e) Kidneys	0	0.0	14	23.3	14	23.3	
f) Bones	0	0.0	48	80.0	22	36.7	
g) Liver	0	0.0	4	6.7	0	0.0	
h) Eye	0	0.0	0	0.0	0	0.0	
i) Do not know	60	100.0	6	10.0	26	43.3	
What are the causes of cancer @							
a) Infection	52	86.7	10	16.7	10	16.7	(543.72) .000*
b) child exposure to radiation	0	0.0	0	0.0	0	0.0	
c) Treatment Error	0	0.0	0	0.0	0	0.0	
d) Inherdetiry	0	0.0	50	83.3	26	43.3	
e) Mother's exposure to radiation during pregnancy	0	0.0	30	50.0	24	40.0	
f) Do not know	60	100.0	6	10.0	10	16.7	
What are the primary signs that appear on a child with cancer@							
a) Sudden weight loss	0	0.0	50	83.3	54	90.0	(522.33) .000*
b) change in the urination and excretory system	0	0.0	0	0.0	0	0.0	
c) unusual bleeding or secretions	0	0.0	6	10.0	6	10.0	
d) difficulty swallowing	0	0.0	52	86.7	40	66.7	
e) indigestion	0	0.0	40	66.7	26	43.3	
f) Hoarseness or persistent cough	0	0.0	0	0.0	0	0.0	
g) fatigue or fever	38	63.3	60	100.0	60	100.0	
h) Change in the skin such as (redness, itching, changing the color of the skin to a darker color)	0	0.0	2	3.3	2	3.3	
i) Do not know	22	36.7	0	0.0	0	0.0	

(@) More than one choice was allowed *: Significant **: Highly significant

Table 5. Total children's parents' knowledge about cancer and its nutrition pre, post and following the program (N=60).

Total children's parents' knowledge	Pre		Post		Follow up		(p-value)#
	No	%	No	%	No	%	
Poor knowledge	43	71.7	0	0.0	0	0.0	**.000**1**
Fair knowledge	15	25.0	18	30.0	22	36.7	**.000**2**
Good knowledge	2	3.3	42	70.0	38	63.3	**.000** 3**
Paired t-test							
Total mean knowledge score	4.53±1.3		9.83±2.8		9.21±1.6		**.000**1** **.000**2** **.000** 3**

#: X2 Test *: Significant **: Highly significant P1: Pre versus Post P2: Pre versus Follow up P3: Post versus Follow up

Discussion

The nutrition management of children with cancer was an important aspect of their multidisciplinary care plan and medical management. The focus of this management had traditionally been on the prevention of under nutrition. Without nutrition therapy, up to 50% of pediatric cancer patients were likely to become malnourished. Nutrition therapy in children with cancer tends to focus on weight and growth-based outcomes whereby the maintenance of normal growth and development was the primary goal of nutrition interventions **(Cohen et al., 2021).** Regarding characteristics of the form and treatment, the present study results indicated that, all of the children were undergoing chemotherapy treatment. This was unique because it was effective for systemic cancers that cannot be managed by surgery or radiation. Also, the mean age of the studied children was 8.30±1.97 years old. This may be related to the most common age of cancer' onset in children was the school age. These results were in accordance with **Kızmazoğlu et al., (2019)** who conduct study about "Assessment of Health-related Quality of Life in Pediatric Acute Lymphoblastic Leukemia Survivors: Perceptions of Children, Siblings, and Parents" and found that 70% of children receive chemotherapy. In the same line, **Boshagh et al., (2022)** who conduct study about ''Effect of Family-Centered Empowerment Model on Knowledge and Caring Performance of Mothers of Children with Leukemia: A Randomized Clinical Trial'' and found that the mean age was 7.41 ± 2.82 years old. Concerning to gender of the studied children, the present study demonstrated that, two thirds of the studied children were males and less than half of the children were ranked as the second within their families. Gender differences were not fully understood but probably reflect differences in exposure to environmental risk factors and hormones, as well as complex interactions between these influences. Gender differences in immune function and response may also play a role in increasing cancer rate in male than female. This results was in agreement with **El malla et al., (2017)** who conduct study in Egypt about "Advances in Pediatric Oncology- a Five-Year Nation-Wide Survival follow-up at Children's Cancer Hospital in Egypt" and mentioned that more than half of studied children were male and disagreed with **Obaid, (2018)** who conduct a study about "Mothers' Knowledge Concerning Leukemic Children Undergoing Chemotherapy Treatment In Oncology Units At Baghdad City" and mentioned that 50% half of studied children were male. The current study results evident that that the mean age of the studied mothers and fathers were 33.73±4.06 and 40.37±2.97 years old respectively. Also, two thirds and two fifth of the studied mothers and fathers completed secondary education. More than two third of mothers were housewives.

The level of education was a key element in understanding and updating information that reflect positively on care provided for the sick child.

These results paralleled with **Arpaci et al., (2018)** who conduct study in India about "Assessment of nutritional problems in pediatric patients with cancer and the information needs of their parents: a parental perspective and stated that the mean age of the studied mothers was 36.46±6.17 year and the mean age of the studied fathers were 39.95±5.73year. In contrast with an Egyptian study conducted by **Hassan and Ibrahim (2018)** to determine the effect of supportive nursing intervention on the burden and coping strategies of 60 mothers of children with cancer and found that more than one third (38.3%) of studied mothers have had a technical education, and majority (80%) of them were housewives.The current study results revealed that, majority of the studied parents were lived in rural area. This result could be related to the Zagazig pediatric Oncology clinic serving children with various types of cancers in Sharkia governorate and surrounding rural and semi-urban areas. In the same context, **the United Nations Educational, Scientific, and Cultural Organization (2017)** documented that the rural population was 57% of the total population worldwide. Similarly, **Egypt Demographics Profile (2020)** reported that the rural community was 57 % of the total residents, and the rate of urbanization was 1.68 % annual rate of change.The current study result demonstrated that the majority of the studied parents had insufficient income. This could be due to the diagnosis of cancer had an impact on family financial status and inadequate income was a major constraint to good nutrition. This finding was congruent with **Ahmed, (2019)** who conduct a study in Egypt about "Effects of empowering families on improving quality of life for children with chronic diseases" and found that more than two thirds of the studied families had not enough income.

Regarding the child's medical history, more than one third of the studied children were diagnosed with Leukemia. This might be due to the Leukemia was the most common cancer incidence in children. This finding was supported with expanding recent literature by the **American Cancer Society (2020)** demonstrated that leukemia is the most significant common in early childhood. In addition to the finding of **Kaur et al., (2017)** who conduct a study about "Assess the Effectiveness of Structured Teaching Program on Knowledge Regarding Home Management of Side Effects of Chemotherapy among Parents" and found that most of children diagnosed with Leukemia. In contrast with the finding of **Sajeev et al., (2017)** who stated that 48.2% of children diagnosed with solid tumors.The present study results showed that more than two thirds of the studied children admitted to hospital one time and stayed from month to two months last year. This might be due to the different investigations and treatment. This finding was incompatible with **Shabeen et al., (2017)** who conduct a study about "Mothers' Knowledge about the Nutrition of Their Children with Leukemia" and found that more than one quarter of the studied children were previously hospitalized for 1 < 7 days.The current study results showed that all of children complained from loss of appetite and tooth decay. Also, the majority of them complained from dry Mouth, oral infection, diarrhea and weight loss. These finding could be explained by all of these symptoms were considered the most common side effects associated with chemotherapy in children. These finding were consistent with **Atay, (2011)** who conducted a study in Turkey about "Symptom characteristics and clustering in children and adolescents undergoing or being off cancer chemotherapy" and found that all children had loss of appetite. In relation to parent's knowledge about cancer, the current study results proved that more than half and all of them did not know the definition and types of cancer before the program. These results could be rationalized as the parents were not informed about childhood cancer and chemotherapy. These finding agreed with **Hasan et al., (2020)** who found that 100% & 88.6% of mothers did not know the definition, types of cancer. The current study results indicated that all of the studied parents didn't know the causes of cancer. Also, more than one thirds of them didn't know the primary signs that appear on a child with cancer before the program. These finding agreed with **Mahmoud and Abd Elaziz (2015)** who conducted a study about "Effect of Psycho Educational Training Program for Parent's Having Child with Leukemia on Their Experience and Psychological Wellbeing" and found that most of parents had insufficient knowledge related to the causes and symptoms of cancer pre-test. Moreover, the present study result illustrated that that more than two third and more than half of the studied parents had a significant good knowledge level after program and at the follow up stage respectively.

This could be due to the nutritional guidelines had a positive effect on the improvement of parents' knowledge. This finding was supported with de la **Maza etal., (2015)** who studied '' Impact of an educational program for parents of children with cancer on the increased knowledge of their children's disease and the decrease in anxiety'' and revealed that the knowledge level of parents of children with cancer increased significantly after they viewed an educational program about cancer. Similarly, this finding agreed with **Nova etal., (2019),** who conducted a study about the effect of multimedia-based nutrition education on parents' knowledge and body weight change in leukemia children and showed that there was a significant improvement in the parents' knowledge level after the multimedia-based education.

Conflict of interest

Authors declare no conflict of interest.

Funding sources

The authors have no funding to report.

Acknowledgement

Special thanks go to the cases who participated in the current study.

REFERENCES

Blaseg, K.D., Daugherty, P. and Gamblin, K.A .(2014): Oncology Nurse Navigation: Delivering Patient-Centered Care Across the Continuum Pittsburgh, PA:P, 102-11٠. Oncology Nursing Society; 2014

Harif, M., & Stefan, D. (2018): Epidemiology of Childhood Cancer in Africa In: Pediatric Cancer in Africa p. 1-4

(Plummer, M., de Martel, C., Vignat , J., Ferlay, J., Bray F, &Franceschi, S. (2016) : Global burden of cancers attributable to infections in 2012: a synthetic analysis. Lancet Glob Health;4(9): 609-16. doi: 101016/S2214-109X(16)30143-7

Armstrong, T., Chen, Y., &Yasui, Y. (2016): Reduction in late mortality among 5-year survivors of childhood cancer. New England Journal of Medicine 2016; 374(9):833–842.

Hughes , N., Williams, J., & Shaw, C. (2017): Supporting the psychological needs of teenagers and young adults during cancer treatment: a literature review. Br J Nurs,26 (Harif& Stefan, 2018).

Cooper, L., & Brown, A. (2015): Treatment of Pediatric Acute Lymphoblastic Leukemia. Pediatric Clinics of North America, 62: 61-73.

National Cancer Institute, (2018): Radiation therapy to treat cancer. Accessed at https://www. Cancer. Gov /about cancer/treatment/types/radiation therapy.

Cohen, J., Goddard, E., Brierley, M. E., Bramley, L., & Beck, E. (2021). Poor Diet Quality in Children with Cancer During Treatment. Journal of Pediatric Oncology Nursing, 38(5), 313-321.

Kızmazoğlu, D., Sarı, S., Sezgin, M. E., Kantarcıoğlu, A., Tüfekçi, Ö., Yenigürbüz, F. D., &Ören, H. (2019). Assessment of health-related quality of life in pediatric acute lymphoblastic leukemia survivors: perceptions of children, siblings, and parents. Turkish Journal of Hematology, 36(2), 112.

Boshagh, F., Hakim, A., Alghasi, A., &Haghighizadeh, M. (2022). Effect of Family-Centered Empowerment Model on Knowledge and Caring Performance of Mothers of Children with Leukemia: A Randomized Clinical Trial. Jundishapur Journal of Chronic Disease Care, 11(3).
10.21608/PSSJN.2016.32515

Obaid, K. B. (2018). Mothers' Attitudes toward Childhood Cancer in Oncology Unit in Pediatric Teaching Hospitals at Baghdad City. Indian Journal of Public Health Research & Development, 9(10).

El Malla, H., Kreicbergs, U., Steineck, G., El Sayed Elborai, Y., Wilderäng, U., & Ylitalo Helm, N. (2017). Advances in pediatric oncology-a five-year nation-wide survival follow-up at Children's Cancer Hospital in Egypt. Journal of Psychology & Clinical Psychiatry, 7(4), 1-8.

Ahamed, A. (2019): Effects of empowering families on improving quality of life for children with chronic diseases. American Journal of Nursing Science, 7(1), 1.

Arpaci, T., Toruner, E. K., & Altay, N. (2018). Assessment of nutritional problems in pediatric patients with cancer and the information needs of their parents: a parental perspective. Asia-Pacific journal of oncology nursing, 5(2), 231-236.

American Cancer Society (2020). Key Statistics for Childhood Cancers, available at https://www.cancer.org/research/cancerfacts-statistics/all-cancer-facts-figures/cancer-facts-figures-2020.html

Egypt Demographics Profile (2020). Available at www.indexmundi.com/egypt/ demographics _profile. Accessed on 28/7/2022.

Egypt Demographics Profile (2017). Available at www.indexmundi.com/egypt/ demographics _profile. Accessed on 26/7/2022.

Kaur, R., Chanu, S. E., &Sorte, D. Y. (2017). A Study to Assess the Effectiveness of Structured Teaching

Program on Knowledge Regarding "Home Management of Side Effects of Chemotherapy" among Parents. Pediatric Therapeutics, 7(333), 2161-0665.

Sajeev, M., Cohen, J., Wakefield, C. E., Fardell, J. E., & Cohn, R. J. (2017). Decision aid for nutrition support in pediatric oncology: a pilot study. Journal of Parenteral and Enteral Nutrition, 41(8), 1336-1347.Shabeen et al., (2017)

Atay, S. (2011). Symptom characteristics and clustering in children and adolescents undergoing or being off cancer chemotherapy. J Buon, 16(4), 751-758

Hasan, E. S. G., Mohamed, S. A. R., Ahmed, S. M., Riad, K. F., & Ali, A. S. (2020). Knowledge and Performance of Mothers Having Children with Cancer Undergoing Chemotherapy. Minia Scientific Nursing Journal, 8(1), 65-74.

Mahmoud, S., &Elaziz, N. A. A. (2015). Effect of PsychoEducational Training Program for Parent's Having Child with Leukemia on Their Experience and Psychological Wellbeing. Journal of Education and Practice, 6(12), 13- 29.

de la Maza LV, Fernandez CM, Concha RL, Santolaya DME, Villarroel CM, Castro CM (2015),. Impact of an educational program for parents of children with cancer on the increased knowledge of their children's disease and the decrease in anxiety. Rev ChilPediatr. 2015; 86:351-6, http://dx.doi.org/10. 1016/j.rchipe.2015.04.027.

Nova, F., Allenidekania, A., Agustini, N., The effect of multimedia-based nutrition education on parents' knowledge and body weight change in leukemia children. EnfermeriaClinica. 2019;29(S2):229-233.

Shabeen, E. G. A., Ali, A. M., & El-Azez, A. (2017). Mothers '' Knowlledge About TheNutriitiion of TheiirChiilldrenwiithLeukemiia. Assiut Scientific Nursing Journal, 5(12), 85-96.