

Perception of Cancer Related Fatigue among Pediatric Patient Undergoing Cancer Therapy

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Abstract

Obesity Fatigue is a common problem in cancer pediatric patients. Fatigue in childhood cancer is a pervasive and distressing symptom described as a “lack of energy. **Aim of study** was to assess the perception of cancer related fatigue among pediatric patient undergoing cancer therapy. **Settings:** The study was carried out in the chemotherapy pediatric units and a bone marrow transplantation unit of Ain Shams Children Hospital affiliated to Ain Shams University Hospitals. **Subject:** A purposive sample included 70 children in the previous mentioned settings. **Tools of data collection:** A predesigned questionnaire format to assess children's knowledge about cancer-related fatigue, children's fatigue assessment sheet to assess children's fatigue during and after cancer therapy session and Children's perception fatigue scale to assess the children's perception of cancer related fatigue. **Results:** This study revealed that, more than half of studied children with chemotherapy were having moderate fatigue, also more than half of studied children who treated by bone marrow transplantation had the extreme fatigue. **Conclusion:** Based on the study researcher questions, it can be concluded that, Fatigue has been identified by children and adolescents who are receiving treatment for cancer as one of the most distressing treatment-related symptoms they experience. **Recommendation:** Develop studies about the perception cancer related fatigue and apply these studies in professional practice with a view to enhancing the evidence of these symptoms and furthering the quality of life of child and adolescent cancer.

Key words: Perception, Cancer, Fatigue, Pediatric, patient, Cancer therapy

Introduction

Although pediatric cancer death rates have declined by nearly 70 % over the past four decades, cancer remains the leading cause of death from disease among children. Worldwide, it is estimated that childhood cancer has an incidence of more than 175,000 per year, and a mortality rate of approximately 96,000 per year (*Bray & Ren, 2013*).

According to the World Health Organization (WHO) there is 150 children

per million under 20 years diagnosed yearly with cancer (*Rebecca et al., 2015*). In Egypt, each year it is estimated that there are approximately 8400 children to develop cancer, 24% of these children died due to lack of adequate treatment and facilities (*Children Cancer Hospital [CCH], Egypt, 2011*).

The causes of childhood cancers are not known, about 5% of all cancers in children are caused by both external factors such as tobacco, infectious organisms, chemicals or radiation and internal factors such as inherited mutations, hormones, immune conditions, or mutations that occur from

metabolism. These causal factors may act together or in sequence to initiate or promote the development of cancer (*Cogliano et al., 2011*).

Cancer-treatment as chemotherapy, radiotherapy, bone marrow transplantation and biological therapy cause fatigue in children, which adversely influence daily life activities and Quality of Life (QOL) (*Armstrong et al., 2010*). Fatigue is a common problem in cancer pediatric patients. Fatigue related to childhood cancer is a pervasive and distressing symptom described as a “lack of energy.

Cancer related fatigue in children is defined as a sense of being weak or having difficulty in moving extremities or even opening eyes, and, lack of concentration or developing negative feelings (*Mary & Kathleen, 2015*). Meanwhile, The most important factors contributing to cancer-related fatigue are pro-aggressive tumor growth, treatment with cytotoxic chemotherapy, biologic response modifiers, or radiation therapy, anemia, pain, emotional distress, sleep disturbance, and poor nutrition (*Moscow & Cowan, 2011*).

The North American Nursing Diagnosis Association (NANDA) classifies fatigue as self-reported diagnosis in an individual unrelieved by rest, which manifests itself with chronic and tiring exhaustion and a reduced physical and mental performance. In order to prevent adverse effect of fatigue, an effective management is attainable with a careful evaluation and designing individual - specific activities (*Erdemir et al., 2005*).

The nurse plays a crucial role to decrease cancer related fatigue in children through assessment of their life style factors affecting on fatigue and promote the optimal condition of physical, psychological and social for children (*Ritchie et al., 2014*).

Nurses undertake substantial responsibilities in assisting children and parents to adjust to the illness and the treatment procedures through avert acute or delayed side effects of the treatment and decrease the intensity of the symptoms by monitoring, providing care, educating and consulting (*Yilmaz, 2012*).

Significance of the problem

Cancer now agreed to be a curable disease, especially with rapid development in medicine and technology, but the prevalence and type of treatment lead to side effects as fatigue. Approximately 150 children were diagnosed with cancer from November 2011 until August 2013 in Ain Shams Children Hospital.

Several studies have documented significantly worse fatigue in cancer survivors compared with other type of fatigue. Cancer related fatigue is the most common symptom reported by pediatric oncology patients with cancer during treatment. An estimated 14% - 96% of children with cancer experience fatigue in worldwide (*Prue et al., 2014*). For this reason, it is mandatory important to assess the perception of children undergoing cancer therapy about cancer related fatigue.

Aim of The Study

This study aimed to assess the perception of cancer related fatigue among pediatric patient undergoing cancer therapy.

Research Questions:

1. What is the perception of pediatric patient undergoing cancer therapy regarding cancer related fatigue?
2. Is there a relation between children's knowledge about cancer and their fatigue?

Subjects and Methods

1. Technical design

Research design:

Descriptive design was used to carry out the study.

Research Settings:

This study carried out at Chemotherapy Pediatric, and Bone Marrow Transplantation Units of Ain Shams Children's Hospital, affiliated to Ain Shams University.

Study subject:

A purposive sample composed of 70 children undergoing cancer therapy in the previous mentioned settings over six month period.

Tools:

1- Predesigned questionnaire format:

It was designed and written in an Arabic language after reviewing related literature, It includes two parts:

Part one:

Characteristics of children as age, gender, child ranking, and residence.

Part two:

It included children's knowledge about cancer related fatigue as concept and causes of fatigue.

Scoring system:

The scoring system was followed to obtain the outcome of children's knowledge. The total score of items of the questionnaire

responses was 10 grade multiple \times 10 to equal (100%), two scores level were made accordingly, satisfactory by ($50 \geq 100$) grade and unsatisfactory < 50 grades.

2- Children's Fatigue Assessment Sheet:

This sheet was adopted from **National Comprehensive Cancer Network" (2008)** to assess children's fatigue during and after cancer therapy session ,it include the following:

- Physical assessment as shortness of breath, heart palpitation, hyperthermia, nausea, vomiting, generalize weakness, pain, loss of appetite, heaviness of limbs and headache.
- Psychological assessment as restlessness insomnia, sleep disturbance, sadness, depressed mood, crying and irritability.
- Cognitive assessment as lack of concentration, forgetfulness, lack of thinking and confusion.

Scoring system:

- A scoring system was followed to assess the children's fatigue, the total score was 10; it consisted of 20 items classified into:
 - Mild fatigue 1>3
 - Moderate fatigue 3>5
 - Sever fatigue 5>7
 - Extreme fatigue 7 \geq 10

3- Children's Perception Fatigue Scale:

It was adopted from **Oncology Nursing Society to pediatric patient, (2000)** to

assess the children's perception of fatigue according to type of therapy through using the "Numeric Rating scale".

Scoring system:

It was classified into:

- Mild fatigue 1>3
- Moderate fatigue 3>5
- Severe fatigue 5>7
- Extreme fatigue 7≥10

Content validity and reliability:

It was ascertained by a group of experts (5) from Faculty of Medical Surgical and pediatric Nursing specialty. Their opinions were elicited regarding the tools format layout, consistency and scoring system. The contents of the tools were tested regarding the knowledge accuracy, relevance and competence.

II. Operational design

• **Preparatory phase**

The researcher reviewed the local and international related literature and studies covering various aspects of the perception of cancer related fatigue among pediatric patient undergoing cancer therapy using books, articles and magazine to develop study tools.

Ethical considerations

The researcher clarified the study aim to the caregivers and their children included in the study, where the researcher assured that the study is harmless, anonymity and confidentiality of the obtained data were secured, also the caregivers and their

children had the right to withdraw from the study at any time.

• **Pilot study**

A pilot study was carried out during March 2013. It was applied on seven cancer pediatric patients in the chemotherapy pediatric unit and a bone marrow transplantation unit of Ain Shams children' hospital to assess the study tools for its clarity, applicability and time required for filling the tools and appropriate modifications were done prior to data collection for the actual study.

• **Field work**

Data collection started from the first week of April 2013 up to the end of September 2013, the researcher was available in the study settings three days/week (Saturday, Monday and Thursday) from 9Am to 2Pm. The researcher introduced her self to children and their caregivers, then explain the purpose of the study to each child before answer the questionnaire. The tools for data collection were filled for each child individually by a researcher and the time needed for the completion of data for each child was around one hour.

III. Administrative design

An official letter was issued from the dean of the Faculty of Nursing, Ain Shams University to the medical and nursing directors of the Ain Shams Children' Hospital, explaining the purpose of the study to obtain the permission to conduct this study.

IV. Statistical design

The collected data were revised, coded, tabulated and statistically analyzed by using number and percentage distribution. Chi-square test, mean and standard deviation were used to estimate the statistical

significance difference between variables of the study.

Results

Table (1): Concerning the characteristics of the studied children it was found that, the mean age of children was 12 ± 4 years. More than half of them were female. Concerning ranking of children, 47.2% were the first and about two thirds of them (62.9%) lived in a rural area.

Table (2): This table clarifies that about three quarters (72.8%) of the children had concept of cancer related fatigue as generalized weakness, while 58.5% and 32.8% of them described cancer related fatigue as hyperthermia and difficult of education respectively.

Concerning children's knowledge about the cause of cancer-related fatigue, it was clarified that 71.4% of them mentioned that disease is the main cause of fatigue. While 12.8% of them mentioned that no response to treatment is the causes of fatigue.

Table (3): As regards physical problems among children with cancer during and after receiving cancer therapy this table illustrated that 65.0 % of children have generalized weakness during chemotherapy administration compared to 50.7% after administration.

Table (4): As regards psychological problem among children with cancer during and after receiving cancer therapy this table illustrates that 71.4% of children have restlessness and irritability during chemotherapy administration.

Table (5): As regards cognitive problems among children with cancer during and after receiving cancer therapy, this table illustrates that, 17.4%, 27.2% and 50% of children have a lack of concentration during chemotherapy, bone marrow transplantation and radiotherapy respectively. This table also shows that 45.4 %, 50% and 40% of children were confused after bone marrow transplantation, biological therapy and surgical therapy respectively.

Table (6): This table showed the effect of fatigue on daily living activities of children, where 57.1% of children had sleep disturbance while, 71.4% and 85.7% of them were absent from school and had difficulty of feeding, respectively.

Table (7) illustrates that, 50.8%, 50% and 66.6% of children treated with chemotherapy, biological and radiotherapy had moderate fatigue respectively ,while ,40% of them treated with surgical therapy had severe fatigue. This table also showed, that more than half, of children (54.5%) treated with bone marrow transplantation had extreme fatigue.

Table (8): This table shows that, there was highly statistically significant differences ($X^2 8.936$, $p > 0.001^{**}$) between children 'knowledge and their perception of cancer related fatigue, where 57.9% of children with moderate fatigue had unsatisfactory knowledge and about one third 34.3% of them with severe fatigue had satisfactory knowledge.

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Table (1): Number and Percentage Distribution of the Studied Children According to their Characteristics

Characteristics of Children	Total No 70=100 %	
	No	%
Age in years		
6<12	42	60
12-<18	28	40
Mean \pm SD	<i>12 \pm 4</i>	
Gender		
Male	28	40
Female	42	60
Rank		
1 st	33	47.2
2 nd	25	35.7
3 rd or more	12	17.1
Residence		
Rural	44	62.9
Urban	26	37.1

Table (2): Number and Percentage Distribution of Children's Knowledge Regarding Concepts and causes of Cancer-related Fatigue.

Children's knowledge	Total No. 70=100 %	
	No	%
Concept of fatigue		
Generalized weakness	51	72.8
Hyperthermia	41	58.5
Heaviness of limbs	42	60.0
Loss of appetite	39	55.7
Difficult of education	23	32.8
Causes of fatigue	No	%
Disease itself	50	71.4
Duration of illness	13	18.6
Type of treatment	20	28.5
No response to treatment	9	12.8
Side effect of treatment	21	30.0

Table (3): Number and Percentage Distribution of Physical Problems among Children with Cancer-Related fatigue During and After receiving Cancer Therapy.

Physical Problem	Chemotherapy (NO 63)				Bone marrow transplantation (No M)				Radiotherapy (No 6)				Biological therapy (No 6)				Surgical (No5)			
	During		After		During		After		During		After		During		After		Pre		After	
	NO	%	NO	%	No	%	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%
Shortness of breath	12	19.0	5	7.9	4	36.3	6	55.5	0	0.0	0	0.0	2	33.3	3	50	2	40	2	40
Heart palpitation	13	20.6	5	7.9	5	45.4	6	55.5	0	0.0	0	0.0	3	50	2	33.3	2	40	1	20
Hyperthermia	23	36.5	39	61.9	7	66.6	9	88.8	0	0.0	0	0.0	5	83.3	2	33.3	1	20	5	100
Nausea and vomiting	30	47.6	14	22.2	7	66.6	7	66.6	0	0.0	0	0.0	2	33.3	3	50.0	0	0.0	2	40
Generalized weakness	41	65.0	32	50.7	8	77.7	11	100.0	4	66.6	0	0.0	5	83.3	4	66.6	3	60	5	100
Pain	12	19.0	14	22.2	4	33.3	11	100.0	0	0.0	5	83.3	4	66.6	2	33.3	1	20	5	100
Loss of appetite	39	61.9	24	38.0	5	44.4	11	100.0	0	0.0	1	16.6	5	83.3	4	66.6	3	60	3	60
Heaviness of Limbs	14	22.2	13	20.6	0	0.0	8	77.7	2	33.3	0	0.0	3	50.0	3	50	1	20	3	60
Headache	63	32.8	10	15.8	0	0.0	0	0.0	0	0.0	2	33.3	3	50.0	0	0.0	2	40	3	60

*Number is not exclusive

Table (4): Number and Percentage Distribution of Psychological Problems among Children with Cancer-Related fatigue During and After receiving Cancer Therapy.

Psychological problem	Chemotherapy (No 63)				Bone marrow transplantation (No 11)				Radiotherapy (No 6)				Biological therapy. (No 6)				Surgical (5)			
	During		After		During		After		During		After		During		After		Pre		After	
	No	%	No	%	No	%	NO	%	No	%	No	%	No	%	No	%	No	%	No	%
Restlessness	45	71.4	5	7.9	11	100	11	100	3	50	2	33.3	5	85.7	4	66.6	2	40.0	5	100
Insomnia	11	17.4	0	0.0	1	9.09	4	36.3	2	33.3	00	0.0	0	0.0	0	0.0	2	40.0	3	60.0
Sleep disturbance	15	23.8	4	6.3	4	36.3	7	63.6	2	33.3	0	0.0	1	16.6	4	66.6	3	60.0	3	60.0
Sadness	35	55.5	4	6.3	6	54.5	10	90.9	2	33.3	0	0.0	4	66.6	4	66.6	5	100.0	3	60.0
Depressed mood	8	12.6	1	1.5	2	18.1	7	63.6	2	33.3	1	33.3	1	16.6	1	16.6	3	60.0	3	60.0
Crying	17	26.9	1	1.5	2	18.1	7	63.6	1	16.6	1	16.6	1	16.6	1	16.6	2	40.0	3	60.0
Irritability	45	71.4	5	7.9	11	100	11	100	3	50	2	33.3	5	85.7	4	66.6	2	40.0	4	80.0

*Number is not exclusive

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Table (5): Number and Percentage Distribution of Cognitive Problems among Children's with Cancer-Related fatigue During and After receiving Cancer Therapy.

Cognitive problem	Chemotherapy (No 63)				Bone marrow transplantation (No 11)				Radiotherapy (No 6)				Biological therapy. (No 6)				Surgical (No 5)			
	During		After		During		After		During		After		During		After		Pre		After	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Lack of concentration	11	17.4	7	11.1	3	27.2	4	36.3	3	50	3	50	1	16.6	0	0.0	0	0.0	2	40
Forgetful	11	17.4	4	6.3	0	0.0	2	18.1	2	33.3	1	16.6	2	33.3	2	33.3	0	0.0	3	60
Lack of thinking	9	14.2	3	4.7	0	0.0	2	18.1	2	33.3	1	16.6	1	16.6	1	16.6	2	40	2	40
Confusion	7	11.1	9	14.2	3	27.2	5	45.4	0	0.0	2	33.3	1	16.6	3	50	2	40	2	40

Table (6): Number and Percentage Distribution of Children's Perception Regarding Effect of Fatigue on Daily Living Activities.

Effect of fatigue on child living daily activities	Total No. 70=100 %	
	*No	%
Sleep disturbance	40	57.1
Lack of personal hygiene	30	42.8
Absent from school	50	71.4
Unable to play	33	47.1
Difficulty of feeding	60	85.7

Table (7): Number and Percentage Distribution of Children's Cancer Related Fatigue, according to Type of Therapy.

Fatigue assessment	Type of therapy									
	Chemotherapy NO=63		Bone marrow transplantation No=U		Radiotherapy NO=6		Biological NO=6		Surgical NO=5	
	No	%	No	%	No	%	No	%	No	%
Mild	6	9.5	0	0.0	1	16.6	0	0.0	1	20
Moderate	32	50.8	3	27.3	4	66.6	3	50	1	20
Severe	16	25.4	1	18.2	1	16.6	2	33.3	0	40
Extreme	9	14.3	6	54.5	0	0.0	1	16.6	1	20
Total	63	100	11	100	6	100	6	100	5	100

Table (8): Number and Percentage Distribution of Total Children's Knowledge in Relation to Their Perception of Cancer Related Fatigue

Children's perception of cancer fatigue	Children's knowledge					X ²	P- value
	Satisfactory		Unsatisfactory		Total		
	No	%	No	%	No		
Mild	1	3.1	5	13.1	6	8.936	P<0.001**
Moderate	12	37.6	22	57.9	34		
Severe	11	34.3	8	21.1	19		
Extreme	8	25	3	7.9	11		
Total	32	100	38	100	70		

Discussion

Concerning the children's characteristics, the present study revealed that, more than half of children were ranged between 6 to less than 12 years old and 60% of them were female. This result was supported by *Howlader et al., (2014)* their study about cancer in children who founded that more than three quarters of children with cancer aged 5-14 years.

In contrast, *Abd El-karim et al., (2014)* founded in his study about the effect of breathing exercise on respiratory efficiency and pain intensity among children receiving chemotherapy that cancer occurs in male about 1.5 times more than females.

Regarding children's knowledge about cancer related fatigue, the finding of the current study found that nearly three quarters of children and more than half of them defined cancer related fatigue as generalized weakness *and* heaviness of limbs respectively. This result supported by *Akechi et al., (2016)* who found in their study about fatigue and its associated factors in ambulatory cancer patients, that fatigue can be defined as lacking motivation and feeling weak. Furthermore *Martin et al., (2016)* showed in their study about Pharmacological treatments for fatigue associated with palliative care that fatigue is a subjective feeling of tiredness, weakness and lack of energy.

Regarding causes of fatigue, the present study found that three quarters of children mentioned that the main causes of fatigue is disease itself and more than half of them complain of restlessness and irritability as a psychological problems due to cancer therapy sessions. This result is similar to *Maarten et al., (2016)* study about cancer related fatigue: the scale of the problem, who illustrated that the main causes of fatigue is disease, where cancer related fatigue increased levels of depression, anxiety, and

mood disturbance. These psychological symptoms can affect a child's ability to perform daily living activities.

Concerning the physical problems among children with chemotherapy, the finding of this study revealed that more than one third of the children were suffering from hyperthermia, generalized weakness, loss of appetite during receiving chemotherapy sessions. This result supported by *Honna & Nancy, (2002)* study about childhood cancer who illustrated that pediatric patients receiving chemotherapy suffering from hyperthermia, general weakness and loss of appetite.

Regarding children's psychological problems, the finding of this study found that about two third of children undergoing cancer therapy complain of depressed mood after bone marrow transplantation and surgical treatment. This result was similar to *Mackereth et al., (2015)* study about factor that affect fatigue in cancer, who found that children undergoing cancer treatment complain from emotional effects such as anxiety and depression.

As regards children's cognitive problems, the finding of this study revealed that during chemotherapy, bone marrow transplantation, radiotherapy and biological therapy more than one quarter of children complain of lack of concentration and lack thinking. This result supported by *Asher and Myers, (2015)* study about the effect of cancer treatment on cognitive function, who found that more than one quarter of patient complain of cognitive impairment. Moreover, *Fardeil et al.,(2011)* found in their study about chemotherapy and cognitive impairment treatment options, who illustrated that anticancer treatment causes cognitive deficits as memory loss and attention problem.

As regards the effect of fatigue on the child' daily living activities the result of

current study revealed that about three quarters and more than half of studied children perceived to cancer related fatigue as difficult to go to school and sleep disturbance respectively. This result supported by the study of **Hockenberry&Hinds, (2010)** about fatigue in children and adolescents with cancer, who illustrated that cancer related fatigue profoundly affects patients' abilities to perform activities associated with daily living. Meanwhile, **Lopes-Junior (2016)** who illustrated that more than three quarters of children unable to going school and sleep adequately as a result of fatigue.

Concerning to children's perception of cancer related fatigue according to type of therapy, the finding of the current study found that, more than half of children on bone marrow transplantation had extreme fatigue, while more than half of children on chemotherapy and radiation had moderate fatigue. This result supported by **Ann et al., (2012)** study about cancer-related fatigue who showed that bone marrow transplant cause extreme fatigue that lasts up to one year while fatigue usually develops after several weeks of chemotherapy and radiation which increases over time from 3 to 4 weeks after treatment stops, and continue for up to 2 to 3 months.

Regarding the relation between children's knowledge and their perception of cancer-related fatigue, the finding of the current study found that, there were highly statistically significant differences between children's knowledge and their perception of cancer related fatigue where more than half of unsatisfactory knowledge's children had moderate fatigue. This result parallel by **Tomlinson et al., (2016)** study about the lived experience of fatigue in children and adolescents with cancer, who found the majority of unsatisfactory knowledge children had moderate fatigue.

Conclusion

Based on the study results, it can be concluded that fatigue has been identified by children who are receiving treatment for cancer as one of the most distressing treatment-related symptoms and duration of therapy.

There was statistically significant differences between children' knowledge and their perception of cancer related fatigue, where more than half of children with moderate fatigue had unsatisfactory knowledge and about one third of them with severe fatigue had satisfactory knowledge.

Recommendations

In the light of the present study, the following recommendations are suggested:

- Child classes should be encouraged in Oncology Center and a Cancer Hospital to acquire knowledge regarding cancer related fatigue.
- An education program about perception of cancer related fatigue should be implemented for the child's health care providers who should be dealing with children through a holistic approach..
- Further studies about the cancer related fatigue in different health care settings.

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