

Outcome of Enhancement of Maternal knowledge and Practice on health status of their children with cancer¹Ebtisam Mohamed Elsayed and ²Faten Shafik Mahmoud¹Pediatric Nursing Department, Faculty of nursing, Tanta University²Pediatric Nursing Department, Faculty of nursing, Benha Universityebtisamelsayed@yahoo.com

Abstract: Quality of life as an outcome variable has become an important measure in clinical research, making a transition from a "biomedical" model of health to one that incorporates the social aspects of disease. Cancer in children and adolescents is the second most common cause of death in childhood. Nurses play a vital role in management of these children, specially her duty to give correct and current information about the nature of the disease. So this study aimed to assess the role of enhancement of maternal knowledge and practice in improving health status of children with cancer. The study was conducted in Oncology Institute of Tanta and Specialized Pediatric Hospital of Benha city from November 2009 to April 2010. A convenient sample of 100 children with cancer undergoing chemotherapy and their mothers were included in this study (50 from Tanta and 50 from Benha). Their age ranged from 4 to 15 years. Different tools were used to collect the required data: Questionnaire sheet, mothers' Practice Check list and the Pediatric Oncology Quality of life scale which contain Lansky play performance scale, health utilities index and health status classification system. Data collection was considered of pre, and post interviewing (immediately and after 3 months). The findings of this study revealed, statistical significant correlation between total mothers knowledge and practice score and quality of life pre and post intervention. This Improvement reflected in the improved outcome of child health status and the benefits of their treatment. In conclusion: Mothers' knowledge and practice had positive relation with the improvement of health status of children with cancer. Nurse plays an importance and direct role in health teaching and repeated evaluation of health related to quality of children undergoing chemotherapy to achieve their optimal quality of life. The following recommendations are suggested: mothers of children with cancer needs continuous guidance about the nature of the disease, treatment and home care. All medical and Para medical staff who are dealing with those children should be skilled in counseling technique to guide mothers about proper practice of management procedures of cancer children.

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Key word: Enhancement, Maternal knowledge and Practice, health status, children with cancer, Quality of life.

1. Introduction

Cancer is a class of diseases or disorders characterized by uncontrolled division of cells. Cancer in children and adolescents is the second most common cause of death in childhood. The incidence rate of childhood cancer in Egypt (2009) was about 150 cases/per million children of 0–14 years of age every year. Annual incidence of childhood cancer peaks in the first year of life and under 5 years of age. In developed countries only 0.5% and world wide about half of all the childhood cancer cases were diagnosed before 15 years of age. Worldwide, the incidence of childhood cancer for boys was substantially higher than for girls, boy to girls' ratio of 2:1, affect 61.1% of boys and 38.9% of girls (1)

The health-status of children with cancer has been a subject of increasing interest in recent years. Quality of life in pediatric oncology generally refers to a multidimensional construct, which incorporates the domains of physical, social, emotional and cognitive functioning (2). The assessment of HRQL is of great importance for pediatric cancer and their

health-care providers as a result of the advances in cancer treatment and the improvement of the survival rates. Measuring HRQL during the treatment provides useful information to children and families and health care providers. (3).

Quality of life as an outcome variable has become an important measure in clinical research, making a transition from a "biomedical" model of health to one that incorporates the social aspects of disease (4). The mother plays important roles where children with cancer are often limited in their opportunities to develop independence and autonomy. The limitations come from restrictions placed by treatment regimens and therapy-related complications. Therefore, mothers can promote their children to be more comfortable through; prevention of infection; regulate activity, nutrition, skin care, and emotional support. Therefore, mothers must be informed in a manner that they can understand the nature of the disease, its course, treatment, complication, and prognosis (5)

Nurses play a vital role in childhood cancer management. The public relies on nurses to be accessible, well informed and reliable. It is the nurse's duty to give correct and current information and remove barriers to care. Even if the nurse does not feel prepared enough to provide in-depth mother education about childhood cancer; she has a responsibility to assess symptom control, safe medication use and correct any erroneous information (6).

The oncology nurse should have guidelines for assessing cultural beliefs that might influence the family's coping style following a cancer diagnosis. The nurse could provide assistance by assessing the family situation at home; it might be helpful if parents notify a teacher or counselor in school about the adjustments going on at home. Their observations of changes in the child's behavior or school performance may be indicators of the child's coping ability. Nurses teach mothers how to care for the child and provide psychological support to the family and identify factors that will mediate a positive adjustment and outcome. Nursing care should be coordinated to meet child physical and psychological needs and involving the family when needed. (7).

The aim of the study was to:

Assess the role of enhancement of maternal knowledge and practice in improving health status of **their** children with cancer.

Research Hypothesis:

- Treatment of the child is costly if compared to the benefit of the primary prevention.
- No compliance from the family specially mothers as a main care giver to provide a proper care for their children with cancer can be reflected on their children's health status. So educational intervention for mothers about care of those children will enhance their children's health status.

2 Materials and Methods

Research design:

Quasi-experimental design (pre and post intervention) was utilized.

Setting:

The study was conducted in oncology institute of Tanta city and Specialized Pediatric Hospital of Benha city, during the period from November, 2009 to April, 2010

Subjects:

Convenient sample of 100 children with cancer aged from 4 to 15 years and their mothers (50 from Tanta and 50 from Benha) who were attending the

above mentioned settings over 6 months period of the study and were undergoing chemotherapy

Tools of data collection: Data were collected through using the following tools:

1- Structured interviewing questionnaire: It consists of two parts:-

Part I: Socio-demographic data about mothers and children:

- Child (age, gender, diagnosis, and history of disease).
- Mother (age, occupation, and education,).

Part II: Mother's knowledge about cancer: concept of cancer, types, etiology, clinical manifestations, laboratory investigations, complications, treatment, care provided and follow up and source of information.

Knowledge score:

The score of mothers' knowledge was considered satisfactory, if their score 50% and more and unsatisfactory when below 50%.

2- An observation checklist:

It was prepared to observe mothers' practice related to care provided to their children such as: skin care, oral hygiene, drug administration and bathing.

Practice score:

Mothers practice' was considered satisfactory when their practices' scores were 60% and above and unsatisfactory when below 60%.

3- The pediatric oncology quality of life scale (POQOLS):It included two parts:

a- lansky play-performance scale: to assess the performance status of children. It was adopted from Lansky, 1997; and modified by Yaris , 2001; (8, 9) and consisted of eleven levels .The grades were ranged from 0 to 100%.

Lansky Play Performance Scale Scoring System:-

- Fully active, normal 100 %
- Minor restrictions in physically strenuous activity 90 %
- Active, but tires more quickly 80 %
- Both greater restriction of, and less time spent in, active play 70 %
- Up and around but minimal active play, keeps busy with quieter activities 60%
- Gets dressed, but lies around much of the day; no active play; able to participate in quiet play and activities 50%
- Mostly in bed; participates in quiet activities 40%
- In bed; needs assistance even for quiet play 30%
- Often sleeping; play entirely limited to very passive activities 20%
- No play; does not get out of bed 10 %
- Unresponsive 0

b-The health utilities index and health status classification system .This scale was adopted from

Feeny, 1992; and modified by Yaris, 2001;(10,9) to assess the health related QOL for childhood cancer and focuses on functional capacity rather than performance. It comprises six attributes: sensation, cognition, and self-care (which include 4 levels) mobility, pain, and emotion (which include 5 levels).

Ethical considerations:

Each mother was informed about the purpose of the study which was explained to all of them. All data were confidential and used only for the research purpose and an oral consent was obtained from each mother before starting the data collection.

Program Construction:

The program was constructed based on pre-program assessment using the interviewing questionnaire, practice checklist as well as literature review.

General and specific objectives were established including:-

- 1-Mothers 'knowledge about the disease : (Definition of childhood cancer, types , manifestations, predisposing factors ,investigations, treatment, side effects of chemotherapy and nutritional requirements, care of physical problems and continuity of care at home)
- 2-Mothers 'Practice: General care as oral and skin care, bathing, drug administration and body exercises.

Program implementation:

Implementation of the program was carried out at the previously mentioned settings in patient ward or teaching room. The educational materials used have been sequenced through 5 sessions; the duration of each session ranged from 30 to 45 minutes, twice days per week. The mothers were divided into 20 groups, each session contained five mothers. At the beginning of the first session of the program, mothers were oriented about the program contents, its purpose and impact.

Program was implemented during a period of 6 months and it was followed up for three months.

Program evaluation:

The effect of the program on mothers was evaluated by comparing the pre and post assessment (immediately and after 3 months)of the mothers regarding their knowledge and practice. The effect of the program on health status of children was done pre intervention and 3 months post intervention, because of the bad or no compliance of children to answer the questionnaire, make immediately intervention was difficult. .

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software

statistical computer package version 13. For quantitative data, the range, mean and standard deviation were calculated. For comparison between two mean values of the same group pre and post-educational intervention, paired t-test was used. For qualitative data, comparison between two groups and more was done using Chi-square test (X²). Correlation between variables was evaluated using Pearson's correlation coefficient (r). Significance was adopted at p<0.05 for interpretation of results of tests of significance. (11,12)

3. Results:

The study was conducted on 100 children diseased with cancer (50 from Tanta and 50 from Benha), aged from 4-18 years, with mean age 5.6 years±1.95. Out of them, 72% were males and 28% were females. One half of children were at nursery schools, 38% at primary schools, 5% at preparatory schools and 7% at secondary schools. As regard the rank of children, 36% were the last ones, 27% were middle, 28% were of first rank and only 10% were the only child in the family.

The mothers of the studied children aged from 20-35 years, with mean age 32.9 years±6.9. More than half of them (56%) were highly educated, 37% educated at technical schools and only 7% were illiterate. Most of mothers were house wives (92%) and 8% were working.

Out of the studied children, 40% had family history of cancer, one half of them of third grade relatives and equal percent of 25% were of first and second grades relatives.

Fig (1and2) presents the studied children according to their diagnosis and duration of the disease. It was found that, near to half of children (49%) had leukemia, followed by lymphoma and willmes tumor (18%). Fig 1

Regarding the duration of the disease, about two thirds of children (62%) had the disease since less than one year and 18% had the disease since one year and more.

Fig (30): shows mothers perception about the impact of cancer on the studied children and their families . It was observed that, the impact of the disease was higher on child's physical condition(92%), followed by psychological and cognitive condition(80%,68% respectively). As regard the impact of the disease on the families, it was higher and nearly in equal percentage on the financial and social condition of them (95%,97% respectively).

Table (1): presents mothers knowledge about childhood cancer pre and post educational intervention . It was found that, pre intervention the total mean of general information was significantly

lower than post intervention. 5.40 ± 1.93 and 17.5 ± 3.51 respectively and continued higher after 3 months 15.75 ± 3.32 .

Regarding the total mean of mothers' knowledge about chemotherapy, it was improved post intervention from 6.65 ± 1.2 pre intervention to 22.14 ± 3.77 and 16.32 ± 3.84 respectively for immediately and 3 months post intervention. As regard total knowledge score about the disease and chemotherapy, it was improved post intervention (51.20 ± 6.01 and 41.4 ± 6.15 respectively) in comparison to pre intervention (34.20 ± 5.17) $p=0.0001$.

Fig(4); shows mothers' knowledge mean score about childhood cancer at different times of assessment. It was observed that, the mean score was improved immediately post intervention (51.2%), compared by pre intervention (34.2%). The percentage of knowledge post 3 months was significant higher than pre intervention, but not significantly and lower than immediately post intervention (41.4%).

Table (2 and fig 5): shows mothers knowledge about care of physical problems and continuity of home care of their children. It was found that, the percentage of satisfactory knowledge of mothers regarding care of physical problems was significantly higher immediately post intervention in comparison to that, pre intervention (81% and 28% respectively) ($p=0.0001$). The satisfactory knowledge 3 months post intervention was still significantly higher than pre intervention (77% and 28% respectively) ($p=0.0001$), but was not significantly lower than that immediately post intervention. ($p=0.602$)

Fig (6): shows the source of mother's information. It was detected that, the main source of mothers' information was the doctors (33%), followed by nurses (23%) and other families with the same problems (17%).

Table (3 and fig7) :shows the total mean scores of mothers' practice about care provided to their children. It was noticed that, the mean score of mothers' practice was improved post intervention (30.5 ± 0.30) compared by pre intervention (6.01 ± 2.66) ($p < 0.05$).

Table (4) :presents mean scores of performance status of children according to lansky- performance scale and health related quality of life pre and after 3 months of educational intervention. There was statistical significant difference in sensation and mobility, while there was highly statistical significant difference in other attributes of quality of life and performance status of children ($p=0.001$).

Table (5 and fig 8) :presents health related quality of life of children with cancer pre and after three months of educational intervention. It was

found that, level 1 of total QOL represented (22%) pre intervention which was doubled post intervention (47%). While level 5 which represented (6%) pre intervention significantly lowered to (15 %) post intervention ($p= 0.0001$). The same pattern was found as regard different attributes.

Table (6): shows performance status of children according to lansky- performance scale .It was observed that, fully active normal children represented 3% pre intervention, which significantly increased to 23% post intervention. On the other hand, items of bad performance (mostly In bed, participated in quiet activities, in bed, often sleeping, no play and unresponsive) became nothing post intervention with significant difference than pre intervention. ($p=0.0001$)

Table (7): pointed that, significant correlation between total mothers' knowledge and practice with their age, educational level and no significant correlation with the duration of the disease. It was noticed that, there was significant correlation between quality of life scores and educational level as well as performance status of children and the duration of the disease respectively. ($p < 0.05$)

Table (8): revealed that, there was statistical significant correlation between total mothers' knowledge and practice scores pre- immediately post and after three months of intervention ($p < 0.05$).

Table(9): reflected that, there was highly statistically significant correlation between total mothers' knowledge and practice scores and quality of life pre and three months after intervention ($p = 0.001$ and 0.023 respectively).

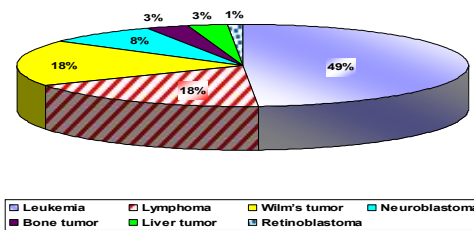


Figure (1): Diagnosis of the studied children with cancer (n=100).

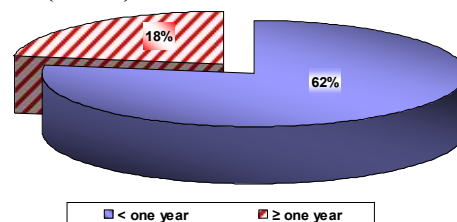


Figure (2): Duration of disease among the studied children with cancer (n=100).

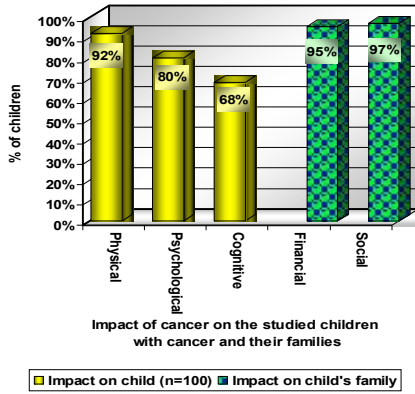


Figure (3): Mothers' perception about impact of cancer on the studied children with cancer and their families.

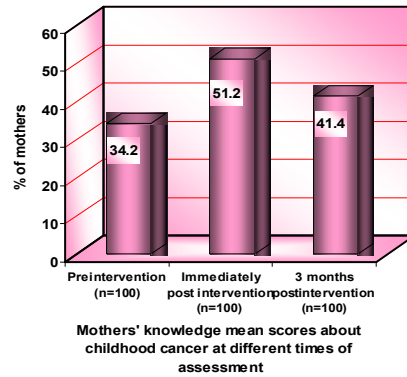


Figure (4): Mothers' knowledge mean scores about childhood cancer pre and post (immediate & after 3 months) educational intervention

Table (1): Mothers' knowledge about childhood cancer pre and post (immediate & after 3 months) educational intervention.

Mothers' knowledge items about childhood cancer	Mean scores of Mothers' knowledge (n=100)			Paired t-test P			
	Pre-intervention (I)	Immediately post (II)	3 months post (III)	I vs II		I vs III	
0	Mean±SD	Mean±SD	Mean±SD	t	P	t	P
•General information:							
-Definition	1.24±1.13	2.03±1.04	1.53±1.07	15.52	0.0001*	12.90	0.0001*
-Types	1.42±1.12	4.51±1.03	4.31±1.08	30.24	0.0001*	22.19	0.0001*
-Predisposing factors	1.21±1.12	3.62±1.90	3.35±1.10	20.23	0.0001*	18.30	0.0001*
-Manifestations	1.25±1.14	3.70±1.80	3.00±1.70	18.33	0.0001*	15.48	0.0001*
Complications	0.28±0.12	3.63±1.80	3.58±1.15	15.26	0.0001*	10.45	0.0001*
Total	5.40±1.93	17.50±3.51	15.75±3.32	18.57	0.0001*	12.51	0.0001*
Chemotherapy:							
-Definition	1.25±1.33	3.01±1.01	2.23±1.08	12.72	0.0001*	8.90	0.001*
-Purpose	1.32±1.47	3.61±1.13	2.41±1.39	11.54	0.0001*	7.19	0.001*
-Route of administration	1.13±1.17	3.92±1.12	2.35±1.15	26.8	0.0001*	20.32	0.0001*
-Side effects	1.39±1.15	3.80±1.10	3.00±1.12	20.46	0.0001*	15.46	0.0001*
-Preparation before	0.78±0.92	3.63±0.17	2.78±0.20	18.73	0.0001*	12.45	0.0001*
-Care during and after	2.11±1.14	4.15±0.10	3.54±0.12	19.24	0.0001*	14.08	0.0001*
Total	6.65±1.20	22.14±3.77	16.32±3.84	21.47	0.0001*	15.48	0.0001*
Total knowledge score	34.20±5.17	51.20±6.01	41.4±6.15	36.36	0.0001	26.10	0.0001*

*Significant (P<0.05)

Table (2): Mothers' Knowledge about care of physical problems and continuity of home care of their children with cancer pre and post (immediate & after 3 months) educational intervention.

Mothers' Knowledge about care of children with cancer	Mothers' Knowledge about care of children with cancer (n=100)					
	Pre-intervention (I)		Immediately post (II)		3 months post (III)	
	Satis-factory	Unsatis-factory	Satis-factory	Unsatis-factory	Satis-factory	Unsatis-factory
	n %	n %	n %	n %	n %	n %
•Care of physical problems X ² P	28	72	81	19	77	23
	17.65 0.0001*					
	I vs II, 54.52, P=0.0001*; I vs III, 46.20, P=0.0001*; II vs III, 0.27, P=0.602					
•Continuity of home care of children: X ² P	12	88	90	10	86	14
	164.93 0.0001*					
	I vs II, 118.63, P=0.0001*; I vs III, 106.62, P=0.0001*; II vs III, 0.43, P=0.514					

*Significant (P<0.05)

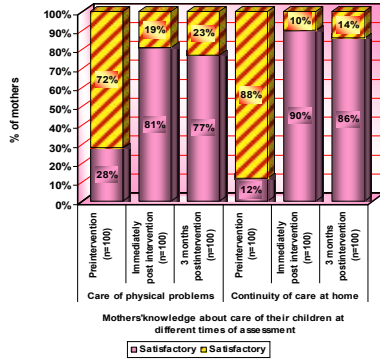


Figure (5): Mothers' Knowledge about care of physical problems and continuity of home care of their children pre and post (immediate & after 3 months) educational intervention.

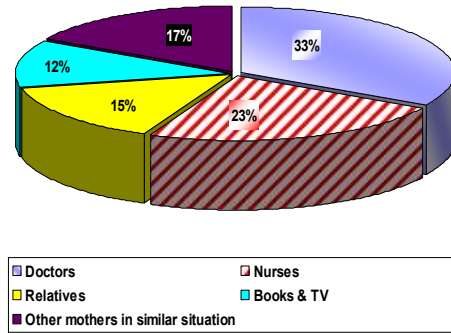


Figure (6): Sources of mothers' information.

Table (3): Mean Scores of mothers' practice regarding their children care pre/immediately post and after three months of educational intervention

Mothers' practice	Mean score of Mothers' practice regarding their children care (n=100)			Paired t-test P	
	Pre-intervention (I)	Immediately post (II)	3 months post (III)	I vs II	I vs III
	Mean±SD	Mean±SD	Mean±SD		
•Drug administration	3.33±0.52	6.50±0.45	4.31±0.51	11.48 0.0001*	7.32 0.001*
•Skin care	2.07±0.26	4.92±0.21	3.75±0.33	8.88 0.001*	6.62 0.001*
•Oral care	2.62±0.63	6.71±0.43	4.55±0.40	16.39 0.0001*	10.32 0.0001*
•Bathing	2.62±0.52	5.70±0.31	3.55±0.49	11.38 0.0001*	8.69 0.001*
Total practice score	6.01±2.66	30.50±0.30	20.24±1.47	20.17 0.0001*	20.36 0.0001*

*Significant (P<0.05)

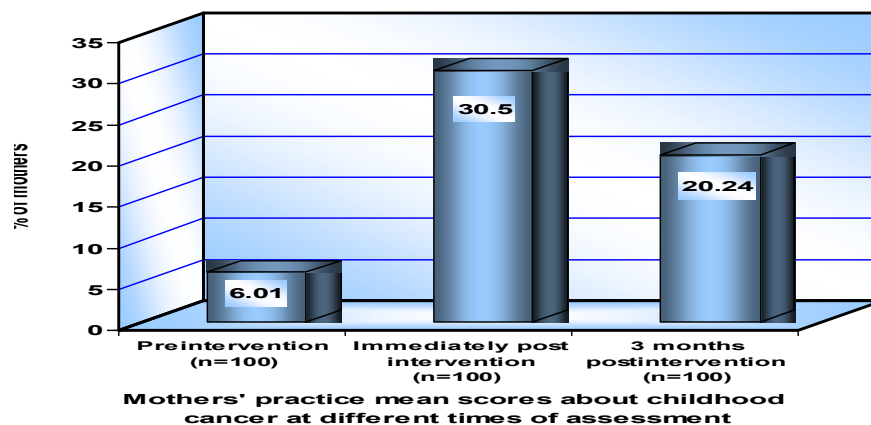


Figure (7): Mean Scores of mothers' practice regarding their children care pre/immediately post and after three months of educational intervention.

Table (4): Mean Scores of the performance status of children according to Lansky-Performance Scale and HRQL pre and after three months of educational intervention.

Attributes	Mean score of health related quality of life (HRQL) among the studied children with cancer(n=100)		Paired t-test	P
	Pre-intervention (n=100)	3 months post (n=100)		
	Mean±SD	Mean±SD		
Sensation	1.26±0.50	1.49±0.32	17.47	0.001*
Mobility	1.23±0.34	1.72±0.26	12.11	0.011*
Emotion	2.26±1.44	3.54±1.06	15.80	0.001*
Cognition	1.10±0.46	1.26±0.27	13.58	0.021*
Self-care	2.87±0.88	2.90±0.70	16.11	0.001*
Pain	2.88±0.95	3.94±0.28	14.89	0.001*
Total attribute	8.60±1.94	13.69±1.77	21.16	0.001*
Total performance score of children	53.60±20.02	68.05±14.51	31.16	0.001*

*Significant (P<0.05)

Table (5): Health related quality of life (HRQL) of the studied children with cancer pre and after three months of educational intervention.

Attributes	Level of health related quality of life (HRQL) among the studied children with cancer (n=100)										X ²	P
	Pre-intervention (n=100)					3 months post-intervention (n=100)						
	1	2	3	4	5	1	2	3	4	5		
	n %	n %	n %	n %	n %	n %	n %	n %	n %	n %		
Sensation	57	43	0	0	0	77	23	0	0	0	8.16	0.004*
Mobility	42	58	0	0	0	78	22	0	0	0	25.52	0.0001*
Emotion	0	22	25	28	25	19	25	28	18	10	27.96	0.0001*
Cognition	32	45	23	0	0	48	42	10	0	0	8.42	0.015*
Self-care	2	50	20	28	0	39	35	23	3	0	56.41	0.0001*
Pain	2	20	18	53	7	18	35	26	21	0	39.18	0.0001*
Total health related QOL	22	40	14	18	6	47	30	15	7	1	18.93	0.0001*

*Significant (P<0.05)

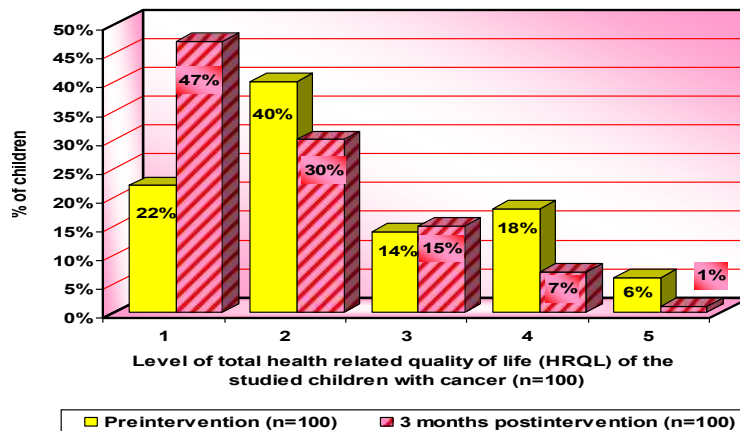


Figure (8): Levels of total health related quality of life (HRQL) of the studied children with cancer pre and after three months of educational intervention.

Table (6): Performance status of the studied children with cancer according to Lansky-performance Scale.

Performance status of children	The studied children with cancer (n=100)			
	Pre-intervention (n=100)		3 months post-intervention (n=100)	
	n	%	n	%
-Fully active, normal	3	3	23	23.0
-Minor restrictions in physically strenuous activity	12	12.0	25	25.0
-Active, but tires more quickly	5	5.0	17	17.0
-Both greater restriction of, and less time spent in, active play	23	23.0	15	15.0
-Up and around but minimal active play, keeps busy with quieter activities	20	20.0	10	10.0
-Gets dressed, but lies around much of the day; no active play; able to participate in quiet play and activities	12	12.0	10	10.0
-Mostly in bed; participates in quiet activities	5	5.0	0	0
-In bed; needs assistance even for quiet play	10	10.0	0	0
-Often sleeping; play entirely limited to very passive activities	5	5.0	0	0
-No play; does not get out of bed	5	5.0	0	0
-Unresponsive	0	0	0	0
X²	46.30			
P	0.0001*			

*Significant (P<0.05)

Table (7): Correlation between mothers' knowledge & practice and both QOL and performance status of the studied children with cancer and socio-demographic characteristics of their mothers.

Variables	Socio-demographic characteristics of Children's mothers (n=100)					
	Age		Educational level		Duration of disease	
	r	P	r	P	r	P
•Mothers' knowledge & practice						
-Total knowledge	0.424	0.08*	0.631	0.000*	0.097	0.461
-Total practice	0.558	0.01*	0.327	0.08*	0.044	0.738
•Children's QOL & Performance status:						
-Total QOL	0.121	0.356	0.376	0.01*	0.144	0.272
-Performance status of children	0.081	0.619	0.103	0.433	0.227	0.03*

r= Correlation coefficient *Significant (P<0.05)

Table (8): Correlation between total knowledge and practice scores of mothers during pre/immediate post and after three months of educational intervention

Mothers' total knowledge related to childhood cancer	Mothers' total practice regarding their children care (n=100)					
	Pre-intervention		Immediate post-intervention		3 months post post-intervention	
	r	P	r	P	r	P
- Pre-intervention	0.249	0.011*	-	-	-	-
-Immediate post intervention	-	-	0.354	0.014*	-	-
-3 months post post-intervention	-	-	-	-	0.476	0.002*

r= Correlation coefficient

*Significant (P<0.05)

Table (9): Correlation between total knowledge, practice scores of mothers and QOL of their children during pre/and after three months of educational intervention

Mothers' total knowledge & Practice	The studied children total quality of life (QOL) (n=100)			
	Pre-intervention (n=100)		3 months post post-intervention (n=100)	
	r	p	r	p
•Mothers' total knowledge:				
- Pre-intervention	0.296	0.013*	-	-
-3 months post post-intervention	-	-	0.541	0.001*
•Mothers' total practice:				
- Pre-intervention	0.266	0.021*	-	-
-3 months post post-intervention	-	-	0.270	0.023*

r= Correlation coefficient

*Significant (P<0.05)

4. Discussion:

Cancer is a class of diseases or disorders characterized by uncontrolled division of cells. The health related quality of life with cancer has been a subject of increasing interest in recent years. The study was conducted on 100 children diseased with cancer (50 from Tanta and 50 from Benha), aged from 4-18 years, with mean age $5.6 \text{ years} \pm 1.95$. males were more than females. This finding was inconsistent with others studies and several international cancer registries, (13-15) whom reported that, the childrens' ages ranged from 8 months to 12 years. or 2 years to 16 years. (16) . In another study (17) reported, fifty-seven percent of the children were male and the mean age at diagnosis was 6.7 ± 5.2 years.

Out of the studied children, forty percent had family history of cancer, one half of them of third grade relatives and equal percent of twenty five percent were of first and second grades relatives. This was inconsistent with other study (13) who reported that, three quarter of patient had at least one sibling in the family. While the mean age of the mothers was 36.87 ± 5.24 years, nearly one out of three parents had fewer than 9 years of schooling. The mothers of the studied children aged from 20-35 years, with mean age $32.9 \text{ years} \pm 6.9$. More than half of them were highly educated, one third educated at technical schools and few mothers were illiterate. The majority of them were house wives and the minority were working. This was inconsistent with other studies (11,12). It could be explained that, the high level of education reflected in mothers ability to provide care to their children and minimizing the hazarder that may occur from the disease and the side effect of treatment .

The current study clarified that, the most common diagnosis was leukemia, followed by lymphoma and willmes tumor . This coincided with the study of Matziou, et al 2009 (13)who found that, diagnosis was categorized as leukemia,lymphoma and solid tumors and Markus, et al., 2006(14) found that, the majority of children suffered from leukemia or malignant lymphoma and malignant brain tumor or another malignant solid tumor. The distribution of cancer diagnoses among the current study sample was similar to that of all newly diagnosed patients in Switzerland aged 6–15 years.This was in the same line with Elattar,et al 2009 (1)who reported that, in Egypt the incidence of cancer type was leukemia, Lymphoma was the next most common followed by brain tumors. According to the result of another study (18), hematological malignancies, tumors of the central nervous system accounted for the majority of all cancers. Leukemia made up most cancers,

followed by tumors of the CNS .The detected childhood brain tumors was in the posterior fossa, . Rechar, (16)reported that diagnoses were acute lymphoblastic leukaemia ,brain tumors, bone tumors ..Another study (17)found that, thirty-six percent of the children had leukaemia, about one third had either brain tumour or solid tumours, .

Regarding the period of disease, less than two thirds having the disease since less than one year. This was consistent with other (13) who reported that the mean time since the initial cancer diagnosis was 16.53 ± 18.07 months. This was in agreement with (17) who found average duration of disease was 2.7 ± 2.4 years (range from 1 month to 12.5 years), with a mean age at death of 9.4 ± 5.8 years.

It was noticed that, mothers' knowledge was improved immediately and 3 months post intervention which slightly declined after 3 months than immediately. The most improvement was found in general information about childhood cancer and care during and after chemotherapy, highly significant statistical difference was observed ($P < 0.001$). These findings were agreed with (19)who concluded that, mothers of children with advanced cancer commonly had lack of training and information about the impact of the disease and treatment on their children, in response to this problem, an educational manual has been designed primarily for mothers to understand the physical and emotional impact of advanced cancer, including strategies to help them cope with chemotherapy and its side effects . The current findings revealed improvement in mothers' knowledge about childhood cancer and chemotherapy which the mothers obtained clinically relevant information and evidence-based recommendations to guide supportive care ,encouraged active learning and application of knowledge is essential. In the study conducted by Gorete (15)to investigate maternal perceptions of childhood cancer and strategies for coping in a pediatric unit in Recife, Brazil, they found information provided opportunity to the mother to prepare and participate in the care of the child together with the healthcare team. Moreover, study done by Rodrigues, et al., (2010)(20) found that there was lack of mothers' information about childhood cancer ,thus the study was to identify the mother's needs during the hospitalization with their child and supported by educational intervention to understand the nature of the disease. Another study done by Wong and Chan, (2006)(21) in Hong Kong described the coping experiences of Chinese parents with children who had cancer during the treatment stage. The parents quickly accepted the reality of their child's illness; they were committed to the care of the

sick child and seek information and emotional support to cope with the situation.

Our opinion that, educational intervention and mutual support would be helpful parents to cope and adjust with the disease process, that highlighted the need for emotional and information support for parents to help them to be able identifying positive aspects of the illness experience and establish hope for the future. Furthermore, the finding was supported by Juma, et al., (2010)(22) who found that, the majority of the mothers had no knowledge of cancer and chemotherapy in children pre program, while after educational intervention the majority of mothers representing identified good knowledge about childhood cancer and chemotherapy.

On investigating the studying mother's practice regarding care of their children with cancer, there was highly statistically significance difference ($P=0.001$) between the mothers' total practices score pre and both immediate and three months post intervention. The majority of mothers had high practice score immediately and after 3 months post intervention, in comparison to pre program. This was supported by Atharos, (2003) (23) who emphasized that, there was highly statistical improvement in mothers' practice provided to their children with cancer after the application of the training program. Similarly, this agreed with study of Christiansen, et al., (2008)(24) who highlighted that, although the support systems offered by the pediatric oncology centers were good, certain areas needed improvement, specifically the manner in which parents were educated and informed. Clavarino, et al., (2009)(25) reported that the educational intervention was highly acceptable and reported increased parents confidence in their practice and support for their children, and to initiate discussion about emotional issues. Evaluation pre- and post-training declared significant improvement in general skills specific to this training. Brief skills training supplemented with tailored educational resources can enhance confidence skills and knowledge regarding care of their children with advanced cancer.

The finding of current study related to quality of life of children pre and after three months of educational intervention showed that there was statistically significant difference in different attributes of quality of life and performance status of children ($p = 0.001$). Moreover, it also reflected general improvement of quality of life after three months of intervention, compared by pre intervention. This result was supported by Yaris, et al., (2001)(9) who reported that, the mean global utility score of children at third months of therapy were significantly better than that at diagnosis ($p=0.04$). The mean single attribute utility scores for

mobility, emotion, self-care and pain at diagnosis were significantly lower than those at three months of therapy. Furthermore, the finding was supported by others. (26,27)

So, Interventions directed at mothers should be included as part of the treatment plan for a child with cancer. Modifiable variables associated with poorer children QOL, such as mobility, emotion, self-care, pain, sleep quality, diet and exercise habits, indicated that, the mothers most likely to experience to improve their children QOL and actual areas for intervention.

The finding of the present study pointed that, significant positive correlation of total mothers' knowledge and practice with age and educational level. There was significant correlation regarding total quality of life of children with educational level of mothers. This can be explained by good educational level of mothers could be reflected on their knowledge about the disease and chemotherapy. Regarding performance scale there was significant positive correlation with duration of the disease. In accordance with the result of the present study Klassen, et al., (2008)(27) reported that there was positive correlation between mothers characteristics associated with education. We think younger age and better children QOL included better child health status and lower treatment intensity. Furthermore Matziou, et al., (2009) (13) reported that the mother's age was a significant predictor of the child quality of life, there was a positive relationship between the mother's age and child physical sub-scale also, the educational level of the mother was found to be a significant predictor for the quality of life. These results were consistent with the study done by John, et al., (2009) and Juma, et al., (2010)(17,22) whom reported that, improving mother's knowledge with educational status was considered major social determinant of health which can improve their knowledge about their children's chronic diseases. This can be reflected in areas of decreasing complications from cancer, Also they revealed that ,mother age and level of education were significant variables that have a significant relation between childhood cancer management skills and its outcomes on the child's health.

The finding of the present study revealed that there was statistically significant positive correlation between total mothers' knowledge score and there total practice score at pre/ immediate post and after three months of implementation ($p < 0.05$). Furthermore there was highly statistically significant positive correlation between total mothers' knowledge scores, and quality of life of their children pre/and after three months of implementation ($p < 0.05$). There was also, a statistically significant

positive correlation between total practice scores of mothers and quality of life of their children pre/and after three months of implementation ($p < 0.05$). These findings highlighted the importance of training program for mothers to improve their knowledge and practice. This was in accordance with the study conducted by Mark, et al.(2005) and (2011), (28,29)who indicated that, there were positive relationships between mother's knowledge and practice which reported higher quality of life. This in turn can promote positive outcomes for their children with cancer.

Conclusion

In the light of the study findings, it was concluded that mothers' knowledge and practice related to care provided to their children with childhood cancer was deficient as none of them had pre-program satisfactory knowledge or adequate practice. This could had a negative impact on their ability to care and quality of life of their children. Several socio-demographic factors had significant relation to mothers' knowledge and practice, such as level of education. The developed educational intervention lead led to significant improvements in mothers' knowledge, practice and quality of life of their children after three months of intervention.

Recommendation

- Provide mothers of children with childhood cancer as being the main member in children's care team by updated pamphlets, posters and arabic booklets which contain an action plan suitable for each child's cancer nature in order to facilitate improving their knowledge.

-Training program should be applied for nurses in the Institute and pediatrics oncology departments to improve their knowledge and practice about childhood cancer, which can improve health status of children.

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