
Discussion

The present study aimed to evaluate the effect of educational intervention on maternal management of children with cancer and evaluate the effect of educational intervention on child progress.

The number of cancer cases has increased significantly all over the world, particularly since last century and cancer has now become one of the most important public health problems worldwide. Cancer used to be classified as an acute disease with an invariably fatal progression and was one of the most frequent causes of death. Today it is classified as a chronic disease with chances of cure in most cases. Therefore, 70% of the children that have cancer can be cured when an early diagnosis is made and treatment is provided at specialized centers, where scientific and technological advances lead to evident improvements (**Gorete, et al., 2007 and Mark & louise, 2011**).

QOL is becoming an integral part of children care and is considered an essential component in evaluating health care outcome. In children, the challenge of coping with cancer, the threatening diagnosis, its repeated treatment cycles and the need for frequent hospitalization that limits social activities is expected to have great impact on the QOL of children (**Elkateb, et al., 2002**).

The findings of the current study revealed that, the mean age of children were 5.6 ± 1.95 years. Regarding to gender, less than three quarters are males. This finding was inconsistent with the study of **(Matziou, et al., 2009)** who studied that, demographic characteristics of participants are (N=149) consisted of 77 children (6–12 years old) and 72 adolescents (12–18 years old) and their mean age was 12.08 ± 3.98 years, it is also supported by **(Markus, et al., 2006)** who reported that, the majority of whom were males (N=92, 61.7%) and this is consistent with findings of several international cancer registries. Also in the same line **(Gorete, et al., 2007)** who reported that, the children's ages ranged from 8 months to 12 years. In another study done in United states by **(Richard, et al., 2005)** who found that the children included 58 males and 29 females aged between 2 years 6 months to 16 years 3 months (mean = 7 years). In another study done by **(Johns, et al., 2009)** reported that fifty-seven percent of the children were male; the mean age at diagnosis was 6.7 ± 5.2 years.

Regarding to the period of disease, less than two thirds of children had the disease since less than one year. This is consistent with **(Matziou, et al., 2009)** who reported that the mean time since the initial cancer diagnosis was 16.53 ± 18.07 months. This is in agreement with **(Johns, et al., 2009)** who found that, the average duration of disease was 2.7 ± 2.4 years (range from 1 month to 12.5 years), with a mean age of death of 9.4 ± 5.8 years.

As regards characteristics of mothers; it was found that, less than half of them aged between 25 : > 30 years, their mean age were 32.9 ± 6.9 years. While the majority of mothers had family size ranged from 3-6 members.

This is inconsistent with (**Matziou, et al., 2009**) who reported that, 111 mothers (74.5%) 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. This is inconsistent with (**Johns, et al., 2009**) who reported that parents were on average 43.6 ± 8.1 years old.

The current study revealed that, more than half of the mothers had high education and the majority 91.7% were house wives. This is in agreement with study done in Taiwan by (**Chou & Hunter, 2009**) who stated that, Participants were financially destitute, (46.9%) were employed and forty-one percent had incomes below 563 USD/month and (9.2%) received government assistance. This is consistent with (**Johns, et al., 2009**) who stated that about half of the mothers had more than a high school education.

The current study clarified that; the children's diagnosis less than half of them had leukemia; less than one quarter had lymphoma compared by the minority 1.7% had retinoblastoma. This is in the same line with the study done in Greek by (**Matziou, et al., 2009**) who found that, diagnosis was categorized as (a) leukemia–lymphoma (N=89, 59.7%) and (b) solid tumors (N=60, 40.3%). Also this is agreement with (**Markus, et al., 2006**) who found that, in Switzerland the majority of children suffered from leukemia or malignant lymphoma. However, about 30 percent of the children were diagnosed with a malignant brain tumor or another malignant solid tumor. This is in the same line with (**Elattar, et al., 2009**) who reported that, in Egypt the most diagnosis OF children with cancer was leukemia, (33.2%) new cases. Lymphoma was the next most common (18.1%), followed by

brain tumors accounting for 7.1%, of all childhood cancer. According to **(Little, 2005)** who stated that hematological malignancies, tumors of the central nervous system account for the majority of all cancers. Leukemia make up most (approximately 25%) childhood cancers, which nearly 80% are ALL, followed in frequency by tumors of the CNS 20% most childhood brain tumors are in the posterior fossa, neuroblastoma 7%, NHL 6%, Wilm's tumor 6% virtually all kidney tumors, Hodgkin's disease 5%, rhabdomyosarcoma 3%, retinoblastoma 3%, osteosarcoma 3%, and Ewing sarcoma 2%. **(Richard, et al., 2005)** reported that, the diagnoses were acute lymphoblastic leukaemia (ALL, n = 57), brain tumours (n = 11), bone tumours (n = 17) and 2 rare cancers. The study done in Canada by **(John, et al., 2009)** found that, thirty-six percent of the children had leukaemia, 32% had a brain tumour and the remaining 32% had other solid tumours, most commonly neuroblastoma, Ewing's sarcoma and rhabdomyosarcoma.

Concerning the impact of childhood cancer on children and their family were found that, the majority of mothers reported physical impact; followed with psychological and cognitive impact respectively. In relation to family impact from childhood cancer all most of them reported financial and social impact. These findings were supported by study done in London (Berg, et al., 2009) who investigated the effects of childhood cancer on participation and QOL. Ninety-two percent of children (9 to 18 years of age) reported living with late effects of lower extremity pain and numbness, memory and attention deficits, and fatigue, depression, or both. Lower engagement in social activities was correlated with lower QOL scores, as measured by the Pediatric Cancer QOL Inventory-32. In

another study done by (Elkateb, et al., 2002) who found that mothers main concern was related to symptoms distress (90%), followed by anxiety related to treatment (81%). The least concern was for physical wellbeing (43%) and social wellbeing (47%).

As regards method of childhood cancer treatment, the results of the current study revealed that, more than half of mothers reported chemotherapy, meanwhile less than two third of mother's uses alternative therapy. This result was agreed with study done in United States by (Markus, et al., 2006) who studied treatment intensity was medium to high in over 80% of the sample, fifty children (96%) had been treated with chemotherapy, 16 (31%) had surgical interventions, and 18 (35%) had received a radiation therapy. Two children had been treated with bone-marrow transplantation. One year after diagnosis two children (4%) had a relapse of the cancer. Regarding uses of CAM (Richardson, et al., 2000, Cassileth & Deng 2004, Vickers, 2004 and Myers, et al., 2008) who illustrated that, the use of CAM by children with cancer is common, up to 84% of children used CAM along with conventional medical treatment for cancer. Also a 2000 study found that 69% of cancer children had used at least one of CAM as a part of their cancer treatment but Most CAM not been rigorously studied or tested.

As regards source of mothers' knowledge about childhood cancer, the current study revealed that, more than one thirds of them acquired their information from child's doctor. Meanwhile less than one third of them obtained their information from nurses. In line with the result of the

present study (Gorete, et al., 2007) reported that each mother's experiences obtained their information and explanations about childhood cancer from various sources including books, doctors, nurses, other mothers they have already experienced the same case, family members, healthcare team, friends and from families in the similar situation. In line with the result of the present study (Christiansen, et al., 2008) reported that mother's interviewees felt well informed by the hospital and found it easy to access information that they needed. The data suggest the majority of parents had a great interest in understanding the disease and treatment, with 91% using the internet to access further information.

The present study illustrated that total mother's knowledge about childhood cancer and chemotherapy pre program were 3% had satisfactory knowledge compared to mother's knowledge immediate post and after three months were 90.1% and 88.8% respectively. There were highly statistical significant difference ($P < 0.001$). These findings were agreed with study done in Italy by (Turner, et al., 2008) who studied 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 had been designed primarily for mothers, after the program mothers were understand the physical and emotional impact of advanced cancer and strategies to help them to cope with chemotherapy. In the study conducted in Brazil by (Gorete, et al., 2007) to investigate maternal perceptions on childhood cancer and strategies for coping in a pediatric unit in Recife, Brazil, he found that information provided opportunity to the mother to

prepare and participate in the care of the child together with the healthcare team. Explained everything very well, to give good care for their child, identify complications that may appear during the long course of cancer with constant follow-up. Another study done in Spain by (Rodrigues, et al., 2010) 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 disease shape and after program raises the mother's essential function for supporting their child with cancer. Moreover, the study done by (Wong & Chan, 2006) in Hong Kong describe the coping experiences of Chinese parents with children who have 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 informational and emotional support to cope with the situation. After educational program and mutual support group would be helpful to parents, it highlighted the need for emotional and information support for parents. Mothers were able to identify positive aspects of the illness experience and establish hope for the future. Furthermore, the finding was supported by (Juma, et al., 2010) who found that the majority of the mothers had no knowledge of cancer and chemotherapy in children pre program, while after educational program the mothers representing 94% identify all knowledge about childhood cancer and chemotherapy.

The researcher view the development of mother's knowledge about childhood cancer and chemotherapy after educational program the mothers obtained clinically relevant information and evidence based

recommendations to guide supportive care, encouraged active learning and application of their knowledge.

In relation to the studied mothers' knowledge regarding to physical problem of their children with cancer, there was highly statistically significant difference between pre and immediate post of mothers' knowledge ($X^2 = 14.89$, $P < 0.01$) compared to mothers knowledge pre and after three months of implementing program was ($X^2 = 12.78$, $P < 0.01$). Also the majority of mothers had satisfactory knowledge immediate post of program implementation in relation to diarrhea, constipation, and hair loss. While, less frequency two thirds was at fever & joint and bone pain. This result was agreed with study done in Brazil by (Ljungman, et al., 2010) who reported that according to pre program mother's had lake knowledge about care of their children in the following areas that causes the most problems for children undergoing cancer treatment, emotional distress, physical problem such as, fatigue, nutrition, vomiting, dry skin, hair loss, bleeding and pain. Pain is the most problematic area. The prevalence of the most problems as adverse effects of cancer treatment decreases over time with educational intervention.

The present study revealed that, there were highly statistically significant difference between pre and immediate post of the program implementation, in relation to the mothers' knowledge regarding to continuity of home care for their children with cancer, $X^2 = 17.57$, $p < 0.001$ compared to pre and after three months of program implementation $X^2 = 15.89$, $P < 0001$. The majority of mothers had

satisfactory knowledge immediate post of the program implementation in relation to contact the doctor regularly before immunization, as well as isolation from infected person, and laboratory investigation. In line with the result of the present study (Fernandez, et al., 2000) who found that in their study done in Spain to evaluate the home care, the study covered children living in Valencia City, 127 mothers included in the home care intervention in 433 occasions. Pre program the mothers not have concept and knowledge about regularity of home care compared to after the program, the immediate raised for early discharge from the hospital (61%), followed by the administration of antibiotics (18%) and chemotherapy (12%) at home. The mothers of 17 children were protected them from other infected diseases. Five of children required opioid treatment for pain control. Six out of eight children is living in the area of direct intervention and regularly contact of the home care team related their immunization. The most common protected items (73%) was the achievement of the goals planned when the mothers was included in the program as personal hygiene, monitor the signs of recurrent, isolation from infection and maintain balanced food. Only two cases (0.5%) we did not found enough cooperation from the parents and the regular care was completed in the hospital. This program has been well accepted by our children's and their mothers and permits to shorten and decrease the stay in the hospital. The study done in Australia by (Kim & Yoo, 2010) added that it is the important to help the families of children with cancer to enhance family function and help children to adjust to school re-entry by maintaining ties with school friends and teachers during treatment.

On investigating mother's practice regarding care of their children with cancer, there were highly statistically significance difference ($P < 0.001$) between the mothers' mean practices score pre/ immediate post and after three months, while the mothers had satisfactory practice pre program were 2% compared to mothers practice immediate post and after three months were 81.1% and 78.8% which reflected general improvement in mothers practice. This result was supported by study done Bangkok by (Attharos, 2003) who emphasized that there was highly statistical improvement in mothers' practice related to their children with cancer after the application of the training program. Similarly, this was agreed with study done in United Kingdom by (Christiansen, et al., 2008) who highlight that although the support systems offered by the pediatric oncology centers were good, certain areas need improvement, specifically the manner in which parents are educated and informed. Three-quarters of parents faced some kind of difficulty when dealing with oral chemotherapy, including problems with the child not taking the drug, after program self reported compliance in this study was high with 69.1% of interviewees stating they never forgot technical practice related to hygiene, oral, skin care. 72.2% of interviewees used a reminder method, of which 81.6% were written reminders. Also by (Clavarino, et al., 2009) study done in London who reported that the educational intervention highly acceptable and reported increased parent's confidence in their practice, support for their children and initiate discussion about emotional issues. Evaluation pre- and post-training included there were significant improvements 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 distribution of the performance status of children according to Lansky-Performance Scale showed that less than one quarter of children had both greater restriction of, and less time spent in, active play before the program, while after three months one quarter of children had minor restrictions in physically strenuous activity, also there were statistical significant difference of performance status of children ($P < 0.001$). This result was agreed with (Yaris, et al., 2001) who found that mean of children at diagnosis were significantly worse than those at third months of therapy ($p = 0.01$), children who were operated at diagnosis had worse performance score than the others ($p = 0.04$), while children who had complete or partial response had better performance score than poor responder at third months of therapy ($p = 0.04$).

The finding of current study related to QOL of children pre and after three months of educational intervention, showed that there were general improvement of QOL between pre and after three months of the program implementation, (56.7%) of children in sensation pre program were in level one, compared to after three months were (76.7%). In relation to mobility the children pre program were (41.7%) in level one, while after three months were (78.3%) at the same level. In addition, the children emotion in level one after three months were (18.3 %). Moreover, children cognition pre program in level one were (31.7%), while after three months were (48.3%). As regard children self care pre program were

(1.7%), meanwhile, more than one third (38.3%) after three months in the level one. In relation to children pain pre program were (1.7%) in the level one, while after three months were (18.3%). This result was supported by study done in Turkey by (Yaris, et al., 2001) who reported that in their study, the mean global utility score of 30 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. Twenty-nine of children (67%) had a deficit in three or more attributes at presentation, whereas half (50%) had three or more deficit at third month. When single attribute utility scores were evaluated it was obtained that the sensation and cognition deficit were reported in very few children at diagnosis and at third months of therapy. Emotional deficit and pain were obtained in the majority of the children. Only one of the children had no deficit on any of the five attributes at diagnosis and at third months of therapy. Furthermore, the finding was supported by study done in Japan by (Yamazaki, et al., 2005) who studied the mothers of children with cancer reported poorer children QOL compared with children norms. Interventions directed to mothers should be included as a 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, indicate the mothers most likely to experience to improve their children QOL and actual areas for intervention.

The finding of the present study pointed out that significant positive correlation of total mothers' knowledge and total practice with age and educational level, while regarding total QOL there were significant positive correlation were found with educational level. Finally regarding performance status of children there were significant positive correlation with family size and duration of disease. In line with the result of the present study (Klassen, et al., 2008) this study done in Canada, reported that there was positive correlation between mothers characteristics associated with education; younger age and better children QOL included better child health status and lower treatment intensity. Furthermore (Matziou, et al., 2009) reported that the mother's age was a significant predictor of the child QOL, there was a positive correlation between the mother's age and child physical sub-scale, the educational level of the mother was found to be a significant predictor for the QOL ($P=0.041$). These results were consistent with the study done in California by (Johns, et al., 2009) and (Juma, et al., 2010) who reported that improving in mother's age and educational status is considered major social determinants of health which can affect on improvement of their knowledge regarding children's with chronic diseases which reflected in areas of decreasing complications from cancer, also revealed that mother age and level of education were significant variables that have a contact 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 mother's knowledge score and

their total practice score at pre/ immediate post and after three months of program implementation ($p < 0.01$). Furthermore reflected that there was highly statistically significant positive correlation between total mothers knowledge scores, and QOL at pre/and after three months during program implementation ($p < 0.01$). There was also, a statistically significant positive correlation between total practice scores and QOL at pre/and after three months during program implementation ($p < 0.05$). This was accordance with the study conducted in United States by **(Mark, et al., 2005)** who indicated that there were positive correlation between mother's knowledge and practice consistently report a higher QOL and can promote positive outcomes for their children with cancer.

This finding highlighted the importance of training program for mothers to improve their knowledge and practice. The mothers through study wanted written information with desired detailed about the child's treatment, teaching problem solving skills, and manage the physical symptoms of their child's illness, these written information needed to be reference when healthcare professionals were not available.