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Post-Traumatic Stress Disorder as Perceived by Parents of Children with Cancer: A Comparative Study

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Abstract: Having a child diagnosed with cancer causes pain and suffering not only for the child but also for the child's parents and whole family. Therefore, this study aimed to assess perceived posttraumatic stress disorder among parents of children recently diagnosed with cancer as compared to those parents of children previously diagnosed with cancer. A descriptive comparative design was utilized in this study. A sample of convenience of 100 parents of cancer children (50 parents of children recently diagnosed with cancer and 50 parents of children previously diagnosed with cancer) was recruited for the conduction of this study. The study was carried out at Abou Al-Reesh pediatric hospital-Cairo University Hospitals and National Cancer Institute Cairo University Hospitals. Socio-demographic/medical data sheet and The PTSD Checklist Civilian (PCL-C) were used for data collection. Findings of this study indicated that, more than two thirds of the parents of children previously diagnosed with cancer were suffering from posttraumatic stress disorder as compared to near half of parents of children recently diagnosed with cancer. To conclude statistical difference was found between parents of children previously diagnosed with cancer and those parents of children recently diagnosed with cancer. Emotional and psychological support programs for both the cancer children and their parents are recommended.

Key words: Post Traumatic Stress Disorder · Cancer Children · Parents

INTRODUCATION

The conceptualization of childhood cancer as a concept considered a traumatic experience for both patients and their caregivers has gained increasing support in a growing body of literature specializing on the topic [1]. Studying the bio-psychosocial effects of pediatric cancer diagnosis and treatment on the children and their parents has been increased in numerous countries [2].

The whole family becomes affected when a child is diagnosed with cancer. According to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV), childhood cancer can precipitate pos-traumatic stress disorder (PTSD) in parents [3]. The child's diagnosis is often the first potentially traumatic event during the disease trajectoryand several potentially traumatic events may follow [4]. The threat to life, seeing the child in pain, experiencing procedural distress and being in emergency situations are examples of potentially traumatic events for parents. Parents' everyday lives during the child's illness are often very demanding with, for example, frequent clinical appointments, multiple hospitalizations and administration of medication, together with the perceived need of checking the child's health status and upholding the child's intake of food and fluids, despite possible lack of appetite and a sore mouth [5].

Parenting a child with cancer Parents who have struggled to obtain the child's diagnosis may feel relief when finally informed about it. They may also experience guilt and self-reproach about not having been effective advocates for their child during the diagnostic process. Others may experience shock, numbness and disbelief [6], especially if told the diagnosis shortly after the first visit to health care due to the child's symptoms [6]. When a child is diagnosed with cancer most parents become involved in the child's care, e.g. administrating medications, monitoring side effects and helping their child to handle emotional and physical concerns.

To offer optimal support to families of children with cancer, a more focused understanding of the nature of parental distress is necessary. Over the past decade,

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increasing support has amassed for understanding the diagnosis and treatment of cancer in one's child as psychologically traumatic events for parents. Symptoms of post-traumatic stress disorder8 (PTSD) such as re-experiencing distressing events, physiologic arousal and efforts to avoid cancer-related experiences have been documented in parents of children who have completed their cancer treatment [7]

Significance of the Study: Despite the importance of nursing role in assessing psychological and emotional effects of parents who have children diagnosed with serious or terminal diseases like cancer, scattered researches were done in this area especially on the national level. Post-Traumatic Stress Disorder (PTSD) is an anxiety disorder that can develop after exposure to a terrifying event or ordeal in which there was the potential for or actual occurrence of grave physical harm. Traumatic events that may trigger PTSD include violent personal assaults, natural or human-caused disasters and accidents. People with PTSD have persistent frightening thoughts and memories of their ordeal, may experience sleep problems, feel detached or numb, or be easily startled. Clinical competence, continuity in staff, satisfaction with basic care needs, emotional support, information, time and participation in decision-making are important aspects of care for children with cancer. Amusement and being cared for by socially competent staff have also been described as important for children.

As nurses play a pivotal, multifaceted role in the assessment and treatment of patients/families with different diagnoses with different age groups; this research could provide nurses and other health professionals with an in-depth understanding related to this topic which could be reflected positively on the quality of patient's/ family's life. Moreover, it is hoped that, findings of this study might help in improving quality of the patient's/ family's care and establish evidence-based data that can promote nursing practice and research.

Aim of the Study: The aim of the current study was to assess perceived post- traumatic stress disorder among parents of children recently diagnosed with cancer as compared to those parents of children previously diagnosed with cancer.

Operational Definitions: Recently diagnosed children: in this current those children who are diagnosed with cancer for 6 weeks only

Previously diagnosed children: in this current those children who are diagnosed with cancer for 6 months up to one year

Research Questions:

Q1: What is the level of post -traumatic stress disorder as perceived by parents of children recently diagnosed with cancer?
Q2: What is the level of post -traumatic stress disorder as perceived by parents of children previously diagnosed with cancer?
Q3: Is there a difference between parents of children recently diagnosed with cancer and those parents of children previously diagnosed with cancer in relation to perceived post -traumatic stress disorder?

MATERIALS AND METHODS

Research Design: The selected design for the current study is descriptive comparative research design. This type of research design involves one or more group of subjects observed in comparing of each [8].

Sample: A sample of convenience of 100 parents of cancer children (50 parents of children recently diagnosed with cancer and 50 parents of children previously diagnosed with cancer) was recruited for the conduction of this study. According to the following criteria mother and/or father, children well diagnosed with cancer with age less than 12 years old.

Setting: This study was carried out at the Out-patients Clinics at the National Cancer Institute- Cairo university hospitals. National Cancer Institute (NCI)- Cairo was established during the 1950s. It included a hospital with 270 beds which was built in the sixties and started operating in 1969. Manpower Included 40 medical staff members as well as, 150 supporting and nursing staff serving in first year of operation about 5,700 new cases and 8,000 outpatient visits. NCI wishes to control of cancer in Egypt through developing and maintaining integrated quality programs in patient care, research, education and prevention. NCI hospital of 550 beds developed in stages. It is now the largest cancer hospital in the Middle East. This project received valuable support from USAID program of the American government, the European Union and the United Nations Development Program (UNDP). NCI-Cairo was accepted into the UICC as full member in 1973 (www.uicc.org/membership/national-institute-cairo).

Ethical Considerations: A written approval was obtained from the director of National Cancer Institute- Cairo University Hospitals to conduct the current study. All subjects were informed that participation in the current study is voluntary and the data collected will be used only for research purpose and anonymity and confidentiality of each participant was protected by allocation of a code number for each response. The participants were informed that they can withdraw at any time during the study without giving reasons; confidentiality was assured and subjects were informed that the content of the tools will be used for the research purposes.

Tools: Data were collected over period of two months by using Socio-demographic and medical data sheet and Post -Traumatic Stress Disorder Checklist Civilian (PCL-C).

Socio-Demographic Data and Medical Data Sheet: It was designed by the researcher it included Part I: socio-demographic and medical data of the child such as age; duration of the disease; treatment types; and complications ……..etc. Part II: it includes demographic data related to parents which includes age; educational level; occupation; and income.

The PTSD Checklist Civilian (PCL-C) [9]: It is a rating scale for assessing the 17 DSM-IV symptoms of PTSD. The PCLC correlates strongly with other measures of PTSD, such as the Mississippi Scale and the Impact of Events Scale. The PCLC is a general civilian version that is referred to "a stressful experience from the past". Answers ranged from1 ("not at all") to 5 ("extremely") to indicate the degree to which they have been bothered by that particular symptom over the past month. A total score is computed by adding the 17 items, so that possible scores range from 17 to 85. A cut-off of 50 on the PCLC is a good predictor of a PTSD.

It has been found to have a very high internal consistency of more than 0.8 in previous studies [5, 10& 11].

Pilot Study: A pilot study was conducted in order to test the reliability and validity of the questionnaire items and clarity of questions. A total of 10% of the sample were recruited for the pilot study. All subjects included in the pilot study met the criteria for inclusion. The pilot study revealed minimal modifications in the questionnaires. Subjects included in the pilot study were excluded from the main study sample.

Procedure:

- The investigators used and followed the back translation procedure for verifying the translation of the tool. In this procedure, (1) the investigators translated the instruments (English formats) into Arabic language, (2) rendered the same English formats to bilingual experts for more verification of the translation of the Arabic formats, (3) the resulting versions were translated back into the original language by other bilingual experts and, (4) minor discrepancies in the content were founded and necessary modifications were done.
- An official permission was obtained from director of National Cancer Institute- Cairo University Hospitals to conduct the study.
- The investigators met with the subjects in the outpatients clinics in the selected hospital, explains the purpose of the study, assured them about confidentiality and anonymity and finally invited them for participation. They were also informed about their rights to withdrawn from the study at any time without giving any reason.
- Each participant was interviewed individually, in semi-structured interview, for about 20 to 30 minutes, the questionnaires were read and explained and the choices were recorded by the investigators. The subjects were asked about their socio-demographic and medical data of the child, demographic data of the parents in addition to PTSD checklist.

Data Management and Analysis: Date was analyzed using statistical package for social science (SPSS) version 20. Numerical data were expressed as mean ± SD and range. Qualitative data were expressed as frequency and percentage. For qualitative data, comparison between two variables was done using chi-square test. Comparison between quantitative variables was done by using independent sample t-test. Probability (P-value) less than 0.05 was considered significant and less than 0.001 was considered as highly significant.

RESULTS

Table (1) revealed that, 60% of the children recently diagnosed with cancer aged between 3 years to less than 6 years as compared 48% of children previously diagnosed with cancer with no statistical significant difference was found between the two groups

(where X^2=1.69 at p= 0.428). Moreover, the table added that more than half of children recently diagnosed with cancer (58%) were females as compared to 54.9% of children previously diagnosed with cancer were males with no statistical significant difference was found between the two groups (where X^2=3.28 at p= 0.194).

Table 1: Distribution of age and gender among cancer children (n=100)

Items	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Age in years	No	%	No	%	X^2	p-value
3-	30	60.0	24	48.0	1.69	0.428
6-	13	26.0	15	30.0		
9-12	7	14.0	11	22.0		
Mean ±SD	5.20 ±2.87		6.70 ±2.5			
Gender						
Male	21	42.0	28	54.9	3.28	0.194
Female	29	58.0	22	45.1		

Table 2: Distribution of receiving of chemo/or radio therapy among cancer children (n=100)

	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Items	No	%	No	%	X^2	p-value
No	5	10.0	7	14.0	.379	0.538
Yes	45	90.0	43	86.0		
Total	50	100.0	50	100.0		

Table 3: Distribution of treatment complications among the cancer children (n=100)

	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Complications	No	%	No	%	X^2	p-value
No	14	28.0	8	16.0	2.098	0.148
Yes	36	72.0	42	84.0		
Total	50	100.0	50	100.0		

Table 4: Distribution of age among mothers of cancer children (n=100)

Items	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Age in years	No	%	No	%	X^2	p-value
18-	24	48.0	24	48.0	1.73	0.420
30-	22	44.0	18	36.0		
40-50	4	8.0	8	16.0		
Mean ±SD	32.1± 5.8		32.6± 7.3			

Table 5: Distribution of level of education among the mothers of cancer children (n=100)

	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Items	No	%	No	%	X^2	p-value
Can't read and write	30	60.0	7	14.0	2.735	0.434
Read and Write	19	38.0	16	32.0		
Middle education	1	2.0	22	44.0		
Higher education	00	00	5	10.0		
Total	50	100.0	50	100.0		

Table 6: Distribution of occupation among mothers of cancer children (n=100)

	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Items	No	%	No	%	X^2	p-value
Working	11	22.0	5	10.0	3.551	0.169
House wife	39	78.0	45	90.0		
Total	50	100.0	50	100.0		

Table (2) revealed that, most of children recently diagnosed with cancer (90%) were treated with chemo/ or radio therapy as compared to 86%of children previously diagnosed with cancer, with no statistical significant difference was found between the two groups (where X^2= 0.379at p=0.5338).

Table (3) revealed that, near three quarters (72%) of children recently diagnosed with cancer were suffering from treatment complications as compared to 84% of those children previously diagnosed with cancer with no statistical significant difference was found between two groups (where $x^2 = 2.098$ at P = 0.148).

Table (4) revealed that near half (48%) of mothers of children recently diagnosed with cancer aged between 18 years to less than 30 years as compared 48% of mothers of children previously diagnosed with cancer with no statistical significant difference was found between the two groups (where X^2= 1.73at p= 0.420)

Table (5) stated that 60% of mothers of children recently diagnosed with cancer were illiterate as compared to only 14% of mothers of children previously diagnosed with cancer. Meanwhile, 44% of mothers of children previously diagnosed with cancer were secondary educated as compared to only 2% of mothers of children recently diagnosed with cancer with no statistical significant difference was found between the two groups (where X^2 = 2.735at p=0.434).

Table (6) revealed that, more than three quarters (78%) of mothers of children recently diagnosed with cancer were house wives as compared the majority (90%) of mothers of children previously diagnosed with cancer, with no statistical significant difference was found between the two groups (where X^2 = 3.551at p=00.169).

Table 7: Distribution of age of fathers of cancer children (n=100)

Items	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Age in years	No	%	No	%	X^2	p-value
18-	10	20.0	10	20.0	.105	0.949
30-	26	52.0	28	56.0		
40-50	14	28.0	12	24.0		
Mean ±SD	36.7± 6.4		33.2 ±12.5			

Table 8: Distribution of level of education among fathers of cancer children (n=100)

	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Items	No	%	No	%	X^2	p-value
Can't read and write	14	28.0	9	18.0	1.778	0.620
Read and Write	10	20.0	11	22.0		
Middle education	21	42.0	26	52.0		
Higher education	5	10.0	4	8.0		
Total	50	100.0	50	100.0		

Table 9: Distribution of occupation among fathers of cancer children (n=100)

	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Items	No	%	No	%	X^2	p-value
Employee	18	36.0	21	42.0	1.248	0.536
Free working	29	58.0	28	56.0		
Not working	3	6.0	1	2.0		
Total	50	100.0	50	100.0		

Table 10: Distribution of monthly income among parents of cancer children (n=100)

	Recently diagnosed children (n=50)		Previously diagnosed children (n=50)			
Monthly income	No	%	No	%	X^2	p-value
Enough	13	26.0	12	24.0	0.53	0.817
not enough	37	74.0	38	76.0		
Total	50	100.0	50	100.0		

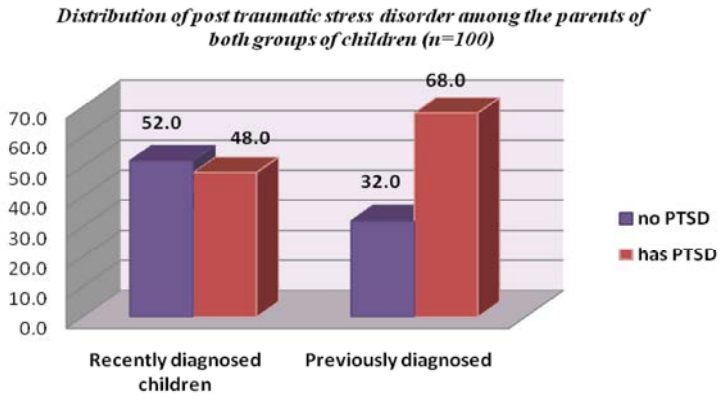

Fig. 1: Distribution of post- traumatic stress disorder among the parents of both groups of children (n=100)

As observed from table (7) more than half (52%) of fathers of children recently diagnosed with cancer aged between 30 years to less than 40 years as compared to 56% of those fathers of children previously diagnosed with cancer, with no statistical significant difference was found between the two groups (where X^2 = 0.105at p=0.949)

Table (8) reported that 42% of fathers of children recently diagnosed with cancer were secondary educated as compared to more than half (52%) of fathers of children previously diagnosed with cancer, with no statistical significant difference was found between the two groups (where X^2 = 1.778 at-p=0.620-).

Table (9) stated that, more than half (58%) of fathers of children recently diagnosed with cancer were free workers as compared to 56% of fathers of children previously diagnosed with cancer, with no statistical significant difference was found between two groups (where x^2 = 1.248 at P = 0.536)

Table (10) reported that, almost three quarters (74%) of parents of children recently diagnosed with cancer revealed that their monthly income not enough as compared to slightly more than three quarters (76%) of fathers of children previously diagnosed with cancer with no statistical significant difference was found between two groups (where x^2 = 0.53 at P = 0.817).

Fig. (1) illustrated that more than two thirds (68%) of the parents of children previously diagnosed with cancer suffering from posttraumatic stress disorder as compared to 48% of parents of children recently diagnosed with cancer.

Table (11-a) revealed that, positive statistical relations were found between age of cancer children, mothers' level of education and posttraumatic stress score where r= 0.273, 0.232 at p= 0.006, 0.20 respectively. Meanwhile there are no statistical relations between the rest of socio-demographic/ medical characteristics and post - traumatic stress score.

As observed in table (11-b) that, statistical relations were found between number of admissions of cancer child into hospital, duration of the disease and posttraumatic stress score where r= 0.383, 0.364 at p= 0.000, 0.26 respectively. Meanwhile there are no statistical relations were found between the rest of socio-demographic characteristics and posttraumatic stress score

Table (12) revealed that, statistical difference was found between parents of children recently diagnosed with cancer and those of children previously diagnosed with cancer, where t=2.81 at p= 0.006

Table 11-a: Relationship between post- traumatic stress score and socio-demographic/medical characteristics ofcancer children and their parents (n=100)

	Posttraumatic stress score	
Socio-demographic characteristics	R	P
Age of the cancer child	0.273*	0.006
Sex of the cancer child	0.034	0.740
Age of mothers	-0.068	0.503
Age of fathers	-0.140	0.167
Mothers' level of education	0.232*	.020
Fathers' level of education	0.027	0.781

*significance level at p<0.05

Table 11-b: Relationship between post- traumatic stress score and socio-demographic/medical characteristics ofcancer children and their parents (n=100)

	Posttraumatic stress score	
Socio-demographic characteristics	R	P
Mothers' occupation	0.044	0.663
Fathers' occupation	0.095	0.346
No. of admissions of cancer child into hospital	0.383*	0.000
Duration of the disease	0.364*	0.026
Suffering from treatment complications	0.106	0.293

*significance level at p<0.05

Table 12: Difference between parents of children recently diagnosed with cancer and those of children previously diagnosed with cancer in relation to suffering from posttraumatic stress disorder (n=100)

Items	Posttraumatic stress Mean ± SD	T-Test	p-value
Recently diagnosed children	56.48 ± 12.46	*2.81	0.006
Previously diagnosed children	28.92 ± 10.27		

*significance level at p<0.05

DISCUSSIONS

The current study results revealed that there is no statistical significance difference between children recently diagnosed with cancer and those previously diagnosed with cancer in relation to age gender; which indicates homogeny between the two studied groups this may be due the pre-determined criteria for inclusion which determined the age of cancer children. The results also added that there is a positive correlational relation between age of cancer children and experiencing posttraumatic stress disorder by their parents which can be explained as the cancer child is growing up his/her suffering and pain is increased which enhance experiencing posttraumatic stress disorder by their parents.

The current study results are supported by Põder[5] who revealed that parents of cancer adolescents reported a higher score for the total posttraumatic stress scale compared to parents of children 4-7 years and parents of children 0-3 years. Moreover the current study results are also supported by Madeliene *et al*.[12] who reported that posttraumatic stress level is increased by increasing of cancer children.

In relation to the medical characteristics of cancer children the current study results revealed that majority of the two studied groups receive chemo/radio therapy, in addition the results also revealed that near three quarters of recently diagnosed cancer children suffering from treatment complications as compared to majority of previously diagnosed. Moreover, the current study results reported that the two groups are homogeneous in relation to the medical characteristics. The currentstudy also added that, in spite of clinically evident increasing treatment complications that cancer children suffering from they did not reach statistical significance correlation in relation to posttraumatic stress disorder among their parents of the two studied groups. This result could be explained by the coping abilities that parents of cancer children got from dealing with daily suffering and pain of their cancer children. Moreover, the study result revealed that there is a statistical significance positive correlation between duration of the disease, no of admission and perceived posttraumatic stress disorder among parents of cancer children. These results can be interpreted by increasing suffering and burden of care among parents by increasing the duration of the disease and frequent admissions into hospitals.

These study results are disagreed with Masa'deh and Jarrah[13] who revealed that, an increase in parental PTSD levels was associated with short time duration since the cancer diagnosis of the child. Meanwhile, these study results are agreed with Landolt *et al*. [14] who revealed that, parent-perceived life threat at the time of the child's diagnosis, length of hospitalization, the child's relapse [14]. Moreover, these study results are supported by Jurbergs *et al*.[15]who reported that parents of cancer children perceived life threat and posttraumatic stress during treatment course of their cancer children. In addition these study results are supported by Anne *et al.*[16] who reported in their study on posttraumatic stress symptoms during treatment in parents of children with cancer that, nearly 80% had at least one parent with moderate-to-severe posttraumatic stress symptoms (PTSS)with minimal associations between in relation to length of timesince diagnosis and treatment complications.

As regards socio-demographic characteristics of mothers of cancer children, these study results revealed that near half of mothers of children recently diagnosed with cancer and mothers of children previously diagnosed with cancer aged between 18 to less than 30 years studied sample. Moreover, the study results reported that near two thirds of mothers of recently diagnosed children with cancer were illiterate as compared to only 14% of mothers of previously diagnosed children with cancer. In addition, the results of current study stated that, less than one quarter of mothers of recently diagnosed children with cancer as compared to only 10 % of mothers of previously diagnosed children with cancer were working mothers.The current study results also added that there no statistical differences were found between the two groups in relation to socio-demographic characteristics of mothers of cancer children which indicated homogeneity between the two groups.

In relation to socio-demographic characteristics of mothers of cancer children and posttraumatic stress disorder among parents of cancer children the current study results revealed that, there is a significant positive correlation between mothers' level of education and posttraumatic stress disorder among parents of cancer children this could be explained by with increasing level

of education the mothers' level of knowledge about cancer and its treatments increased with by turn increase their stress and anxiety about their children disease progress. Meanwhile, there are no statistical correlation between mothers' age, occupation and posttraumatic stress disorder among parents of cancer children.

The current study result is contradicted with Masa'deh and Jarrah [13] who revealed that, the age of mothers of cancer children is negatively associated with the level of posttraumatic stress disorder among parents. The current study result is contradicted with Madeliene *et al*. [12] who revealed that posttraumatic stress disorder increased among mothers of cancer children with young age. Moreover, the current study result is contradicted with Manne *et al*.[7] who revealed that mothers' age is associated with posttraumatic stress disorder among parents of cancer children meanwhile the current study result is agreed with Manne *et al*. [7] who revealed that mothers' level of education is associated with post traumatic stress disorder among parents of cancer children.

In relation to socio-demographic characteristics of fathers of previously diagnosed cancer children and fathers of recently diagnosed children there are no statistical difference between socio-demographic characteristics of the two groups which indicate homogeny between them. Moreover, there are no statically significant correlationwas between fathers'socio-demographic characteristics of cancer children and posttraumatic stress disorders among parents of cancer children. These study results could be explained by that there are no variations between fathers' socio-demographic characteristics of previously and recently diagnosed cancer children. These study results are contradicted with Masa'deh and Jarrah [13] and Manne *et al*. [7] who revealed that, fathers' age and occupation are associated with posttraumatic stress disorder among parents of cancer children.

In relation to post traumatic stress disorder as perceived by parents of recently diagnosed and previously diagnosed cancer children the current study result revealed that more than two thirds of parents of previously diagnosed children suffering from posttraumatic stress disorder as compared to near half of parents of recently diagnosed children with statistical significant difference was found between the two groups in relation perceived posttraumatic stress disorder. This study result can be explained as parents of previously diagnosed children suffer from care burdens of their children treatment compilations, treatment costs, frequent hospitalizations which associated with posttraumatic stress symptoms, meanwhile parents of recently diagnosed children might be suffer from denial as a reaction to their newly diagnosed children. This study result is supported by Masa'deh and Jarrah[13] and Põder[5] who revealed that, posttraumatic stress disorder of parents of cancer children is positively correlated with length of cancer diagnosis. Moreover, this study result is in agreement with Anne *et al*. [16] who revealed that there a minimal positive association between length of diagnosis of cancer and posttraumatic stress symptoms.

CONCLUSIONS

This study concluded that posttraumatic stress disorder is higher among parents of children previously diagnosed with cancer more than those parents of children recently diagnosed with cancer and this is might be due to pain and suffering that previously diagnosed children may have due to complications of chemo and radio therapy which affect the psychological state of their parents, or might be due the denial state which parents of children recently diagnosed may have after their children's diagnosis of cancer.

Recommendations:

- Psychological and emotional support programs are recommended for both cancer children and their parents to avoid PTSD.
- Role of lesion nursing should be enhanced and improvedof mental health nurse in medical and general hospitals
- Nursing students' curricula should include the concept of biopsychosocial approach of care to whole family of the patients with physical and mental diseases.
- Replication of the study to compare PTSD level between fathers and mothers for children diagnosed with cancer is recommended.

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