Assessment of Stressors and Coping Patterns of Children with Newly Diagnosed Cancer during Invasive Procedure

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Abstract

Background: Children suffering from cancer facing many stressors resulting from cancer, its treatment and invasive procedures, these stressors are physical, psychological, social and financial. Nurses play a vital role in caring and educating those children to improve their knowledge, alleviate their stressors and promote their positive coping patterns toward cancer during invasive procedures. **Aim of the study:** To assess stressors and coping patterns of children with newly diagnosed cancer during invasive procedures. **Research design:** A descriptive design was utilized. **Subject:** A purposive sample of 60 newly diagnosed child with cancer (school and adolescent children from 6-18). **Setting:** At outpatient clinics, inpatient wards in Nasser Institute. **Tools:** There are three tools were utilized to collect data: **(1):** Structured questionnaire format to assess socio demographic characteristics of the studied children.**(2):Child behavior checklists (CBCI),** to assess stressors related to children with cancer**. (3): Pediatric cancer coping scale (PCCS)** to assess coping in children with cancer, **Results:** the study revealed that more than half of the studied children had un satisfactory knowledge about invasive procedures, less than half of them were exposed to stressors during invasive procedures and more than one third of them never coping and there was highly statistically significant difference between child coping domains, child behavior checklists and child's age, gender, educational level. **Conclusion:** Children with cancer mainly posed to psychological stressors such as withdrawn, somatic, anxious /depressed, thought disturbances and socially as attention disturbances, delinquent, aggressive behavior, and other stressors problems during invasive procedure and never the children can cope during invasive procedures. In addition, there are statistically significant between stressors, coping patterns and children characteristics. **Recommendation:** Establish training programs for children with newly diagnosed cancer with different coping strategies and how to use.

Keywords: Childhood cancer, Stressors, Coping Patterns, Invasive procedures .

Introduction

Childhood is one of the most important phases of human development and the most important target group for the health team intervention. Childhood cancer is a heterogeneous group of malignancies, consisting of a range of very different diseases with different patterns of occurrence, etiology, treatment and supportive care, survival and the risk of acute toxic side and late effects ***(Leukemia and Lymphoma Society, 2020).***

Over the past five decades, substantial advances in diagnostics, pharmacology, treatment combinations and techniques which cause large improvements in survival from childhood cancer and declining mortality rates**.** On the other hand, children who diagnosed with cancer exposed to, many physical and psychological hurdles both during and after their course of treatment from the hospital setting including demanding medical regimens, aversive treatment side effects ***(Lakhani et al., 2020).***

In addition, children undergoing

treatment for cancer frequently report feelings of social isolation and anxiety regarding invasive procedures. These struggles can cause immediate distress or different stress effects on the children and their parents, which can develop into other psychological problems in the future ***(WHO, 2020).***

So, help the child in providing the best outcome, it is necessary to determine the most beneficial coping strategies for those who are battling cancer. Educating healthcare providers on a number of effective coping strategies will allow patients to receive the highest quality of care. The use of proper coping methods assists in decreasing psychological issues and increasing overall well-being ***(Hess and Gap, 2020).***

Children with cancer undergoing treatment are likely to experience stress, anxiety, and social isolation. One role of a pediatric oncology nurse is to incorporate play into daily hospital routines. By using medical and normative play, nurses can decrease distress and promote normal growth and development, however, the use of play is not limited to pediatric patients. Pediatric oncology nurses play a critical role in the care of children with cancer as new diagnostic techniques become available. They are also leaders in the field of pain management, palliative care, child and family education which help children and their families cope with cancer and its prolonged stressors and treatment ***(Schleisman and Mahon, 2018).***

Significance of the study:

More than 80% of all childhood with cancer occurs in low- and middle-income countries. In Egypt, according to, Children's Cancer Hospital estimated 8500 children diagnosed with cancer every year. Results of the national population-based cancer registry showed a crude incidence rate equal to 128.6 per million children. The rates were 146.6 and 116.0 for boys and girls respectively. Childhood cancers represented 2.7% of total cancer for all ages ***(Galal et al., 2019).***

Childhood cancers that occur between birth to 18 years of age. They differ from adult cancers in the way of growth, spread, treatment, and response to treatment. Globally, 215,000 cancers are approximately diagnosed per year in that age group with an estimated 80,000 cancer-related annual deaths among children ***(WHO, 2020).***

Aim of the study

The aim of the study was assess stressors and coping patterns of children with newly diagnosed cancer during invasive procedures.

Research questions

- What are the stressors and coping patterns of children with newly diagnosed cancer during invasive procedures?
- Is there relationship between stressors and coping patterns of children with newly diagnosed cancer during invasive procedures and their personal characteristics?

Subjects and Methods

Research design

A descriptive research design was utilized.

Setting:

The study will be carried out in outpatient clinics and inpatient wards at

Nasser Institute for Research and Treatment Hospital.

B) Subjects

A purposive sample of all available children (60 child) of newly diagnosed cancer (school and adolescent children from 6-18 yrs) at the previously mentioned setting,

C) Tools of data collection

Three tools were used for data collection, the tools were designed by the researcher after reviewing literature in this field as well as similar researches.

Tool I: Pre-designed questionnaire sheet: It consist of 3main parts.

Part 1: Sociodemographic characteristics of the studied children, this tool was designed to collect data about: age, gender, educational level, diagnosis, department, child's rank, income and child bearing. It consists of (8) MCQ questions.

Part 2: Medical history of the studied children included: time start from diagnosis, other disease, previous hospitalization, period of hospitalization, family history of cancer. It consist of (5) question, (2) of them MCQ and (3) true/false.

Part 3: Assessment knowledge of studied children regarding invasive procedure undergoing medication therapy included: meaning, types of invasive procedures, uses, problems occur, severity of pain, sites given, side effects, coping for pain, care given for child.it is composed of(9) questions (7) of them MCQ and (2) true /false.

❖ **Scoring system:**

It was graded according to correct answer were given a score (1) mark and zero for incorrect answer. A total percentage was 100%. Actual knowledge of the children was categorized into: >60% satisfactory and < 60% un satisfactory.

Tool II: Child Behavior Checklist (CBCI), for ages 6-18, adapted from Nami et- al, (2011) to assess stressors related cancer side effects and it's treatment. It consists of 113 items concerning the child's state at present. Nine symptom groups could be evaluated: 1-Withdrawn (9) items, 2-Somatic complaints (5) items, 3-Anxious/depressed (18) items, 4- Social problems (14) items, 5- Thought problems (11) items, 6-Attention problems (9) items, 7- Delinquent behavior (15) items, 8- Aggressive behavior (15) items, and 9- Other problems (17) items.

❖ **Scoring system:**

Each was evaluated as either Not true, sometimes true, and often true, and these were given scores of 0, 1, and 2 points, respectively. Total score was 100%, <59 points was not true, 60–63 points was sometimes true, and >64 was the often true.

Tool III: Pediatric Cancer Coping Scale (PCCS) for ages 6-18 **adapted from Li-Min et al (2011)** used to assess coping in children suffering from cancer. In a total, PCCS consists of three factor (33 items): cognitive coping(items from 1 to 14), problem oriented coping.(items from 15 to 23) and defensive coping (items from 24 to 33). Each item was rated on three –point: Every time scored (2), usually scored (1), and Never scored (0). In which Never:

<50%,Usually: 50-75% and Every time: >75% and higher scores indicated the most highly used coping strategies.

Content validity and reliability

Content validity

It was established for face and content validity by a panel of three experts in pediatric nursing that reviewed the tools for clarity, relevance, comprehensiveness, simplicity, minor modifications were applied.

Face validity verifies that the instrument looked like, it was valid or gave the appearance of measuring the content desired for a study. **Content-related validity** examines the extent to which the method of measurement includes all the major elements relevant to what is being measured**.**

Reliability

Reliability testing was done using cronbach's alpha test that measures the degree of reliability for the entire form. The reliability for questionnaire was 0.834 by alpha cronbach's

Ethical considerations:

The protocol was reviewed and accepted by the Research Ethical Committee of Faculty of Nursing / Ain Shams University. Each study subject was informed that the study is harmless. Confidentiality of data was kept and all the gathered data was used for research purpose only. Oral acceptance was taken from each child and written acceptance was taken from the manager of the hospital.

Pilot study

A pilot study was carried out on 10%(6 child) from total sample to assess the tools clarity, arrangement of the items, applicability of the data collection tools and time consuming for each tool. Items were rearranged and modifications to the tools were done based on the findings of the pilot study. Some questions were omitted, added or rephrased and then the final form was developed. The child recruited in the pilot study were excluded from the current study subjects.

Field work

Data were collected within three monthes, from the begning of December 2020 to the end of February 2021. The researcher first met with the children and their parents and explained the purpose of the study after introducing him self before starting the data collection where each child was interviewed individually.

The researcher was visiting the study setting three days /week (Saturday, Sunday & Monday) to oncology in patient wards and outpatient clinics at Nasser institute at morning shift (8 a.m -2 p.m) to collect data . The questionnaire and the scale was filled in by the researcher, it consumed 30 minutes. The questionnaire sheet consumed 5 minutes, while the child behavior checklist take 15 minutes, and pediatric cancer coping scale was filled in time 10 minutes .

III. Administrative design

An official permission to carry out the study was obtained from dean of the Faculty of Nursing -Ain Shams University and approved from the Nasser Institute hospital administration for conducting this study in the light of clear explanation about nature of the study and its expected out comes and importance.

Results

Table (1): shows that 36.7.% of the studied children, their age ranged between 6-12 yrs, and 63.3% of them were ranged between 12-18 yrs. As regards to educational level, and child bearing half of the studied children 50% were at secondary education, and caring by their father and mother, 30.0% of the studied children were the second child and preparatory education. And 80% of them not have enough income.

Figure (1): shows that more than half of the studied children 50.4% had un satisfactory knowledge about invasive procedures followed by less than half of them 49.6% had satisfactory knowledge.

Table (2): Show that more than half 51.5% were sometimes true regarding withdraw, 43.9 % of them were not true as regards to somatic complaints, 51.8% of them were not true related to anxious/depressed symptoms, 56.4% of them were not true regarding social problems,(68.8%) of them were not true as regards to thought problems, 28.6% of them were sometimes true related to attention problems, 94.0% of them were not true regarding to delinquent behaviors, 80.8% of them were not true related to aggressive behaviors, 79.4% of them not true as regards to other problems. In relation to total mean of (often true, sometimes true, not true) is (8.5%, 30.9%, 60.6%).

Figure (2): illustrate that 60.6% of the studied children were not had stressors during invasive procedures, followed by 30.9% of them were sometimes exposed to stressors during invasive procedures and 8.5% of them were often exposed to stressors during invasive procedures.

Table (3): show that more than one third 38.58% of the studied children never had cognitive coping, less than half 45.8% of them usually had problem oriented coping and half of them 50% usually had defensive coping, regarding to total mean for every time, usually and never is (19.8 %,43.2%, 37.0.%)

Figure (3): shows that less than half 43.3% of the studied children were usually coping during invasive procedures, followed by more than one third 37% of them were never coping and 19.8% of them every time coping during invasive procedure.

Table (4): presents that there was highly statistically significant difference between child' cognitive and problem oriented coping domains and their age with (F=3.857&3.184 respectively) and P- value (0.000&0.004).

Table (5): presents that there was statistically significant difference between children knowledge and their age, with (F= 2.556) with p- value (0.038).Also there was highly statistically significant difference between children knowledge and their diagnosis (F=6.893 respectively) and P- value (0.000).

Table (6): present that there was highly statistically significant difference between child' behavior checklists and their age, gender, educational level, department and child bearing with (F= 3.872,5.468,2.517,6.201, 4.390 respectively) and P- value(0.001,

0.006,0.007, 0.008,0.003).Also there was statistically significant difference between child' behavior checklists and their rank, income with (F=1.991, 2.370)with p-value (0.032, 0.010).

Table (1): Distribution of the studied children according to their socio-demographic characteristics (*n*=60).

Items	No.	%
Age (years)		
• 6-12years	**22**	**36.7**
• 12-18 years	**38**	**63.3**
Mean ± SD / 1.3667 ± 0.48596		
Educational level		
• Secondary education	**30**	**50.0**
• Preparatory education	**18**	**30.0**
• Primary education	2	3.3
• Illiterate	10	16.7
Department	36	60
• In patients	24	40
• Outpatients		
Child rank:		
• First	8	13.3
• Second	**18**	**30.0**
• Third	16	26.7
• Fourth	16	26.7
• others	2	3.3
Income		
• Enough	12	20
• Not enough	**48**	**80**
Child bearing		
• Mother and father	**30**	**50.0**
• Father	8	13.3
• Mother	22	36.7

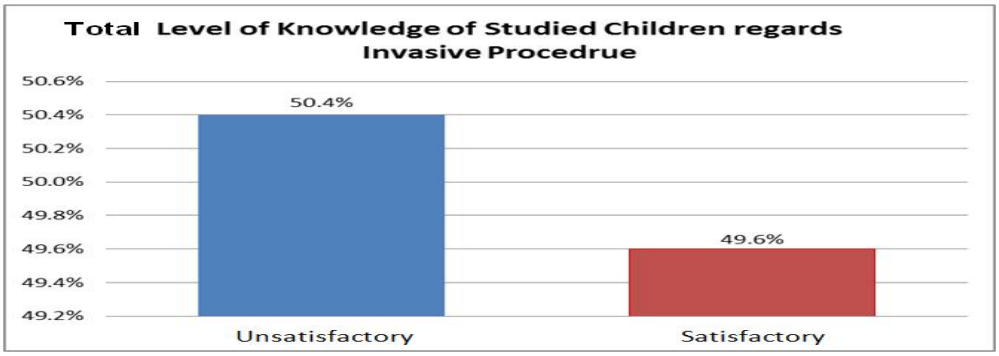

Figure (1): Distribution of the studied children according to their total knowledge as regard to invasive procedure during treatment (n=60).

Table (2): Number &percentage distribution of the studied children according to total summission of child behavior checklists (CBCI) (n=60).

Domains	OFTEN TRUE		SOMETIME TRUE		NOT TRUE	
	N	%	*N*	%	*N*	%
Withdrawn	6.75	10.5	**30.8**	**51.5**	22.8	38
Somatic complaints	10	16	23.3	38.9	**26.7**	**43.9**
Anxious/depressed symptoms	6.8	11.5	22.2	37.1	**31.2**	**51.8**
Social problems	5.3	8.8	17.6	29.3	**33.9**	**56.4**
Thought problem	1	1.6	17.8	29.6	**41.2**	**68.8**
Attention problems	11.3	20	**47.8**	**28.6**	18.9	11.3
Delinquent behavior	0.4	0.6	3.2	5.3	**56.4**	**94.0**
Aggressive behaviors	2.1	3.56	8.4	13.99	**49.4**	**80.89**
Other problems	5.52	9.12	6.82	11.36	**47.6**	**79.4**
Total mean score	**5.2**	**8.5**	**18.5**	**30.9**	**36.4**	**60.6**

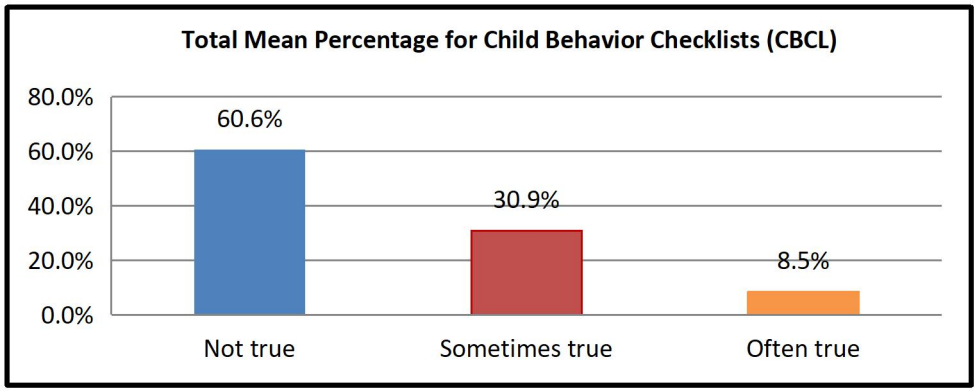

Figure (2): Distribution of the studied children suffering from cancer according to total mean score of child behavior checklist.

Table (3): Total mean score for coping scale. (n=60).

Items	EVERY TIME		USUALLY		Never	
	N	%	*N*	%	*N*	%
Factors(1): Cognitive coping	16.7	27.85	20.1	33.56	**23.2**	**38.58**
Factor(2):Problem oriented coping	10	16.6	**27.5**	**45.8**	22.5	37.5
Factors(3):Defensive coping	9.6	16.0	**30**	**50.0**	20.4	34.0
Total mean score	**11.9**	**19.8**	**25.9**	**43.2**	**22.2**	**37.0**

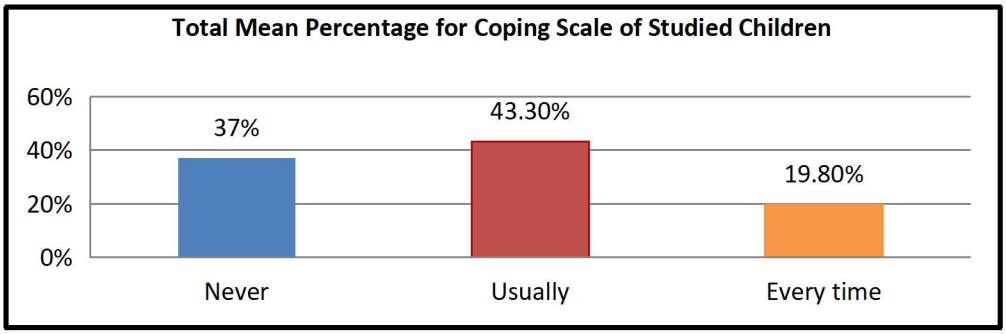

Figure (3): Distribution of studied children suffering from cancer according to their total mean score for coping scale during invasive procedures.(n=60)

Table (4): Relation between children coping domains and their age.

Coping domains	Age (n=60) 16-12years (N=38) Mean	SD	12-19 (N=22) Mean	SD	ANOVA (F)	P-value
Cognitive	11.052	±4.561	15.00	±4.298	**3.857**	**0.000 ****
Problem oriented	7.7895	±2.877	8.5455	±1.818	**3.184**	**0.004 ****
Defensive	8.5789	±2.877	7.727	±2.728	1.710	0.105 NS

*P< 0.05 significant ** P<0.01 highly significant, Not significant p >0.05

Table (5): Relation between Children socio -demografic characteristics and their Knowledge regarding invasive procedures.

Socio-demographic		knowledge N=(60) Mean	SD	F	p-value
AGE	6-12years	14.8947	1.2256	**2.556**	**0.038**
	12-18	14.8947	1.2256		
Gender	Male	14.6286	1.3080	.900	0.488
	Female	14.3200	1.4059		
Educational status	Secondary E	15.0120	1.7068	.595	0.704
	Preparatory E	12.6367	1.5880		
	Primary E	13.4244	.0412		
	Illiterate	13.0222	.0231		
Diagnosis	Acute	13.3333	1.0328	**6.893**	**0.000 ****
	Wilms's tumors	15.0000	1.0220		
	Bone tumor	15.0000	1.0220		
	Leukemia	12.0000	.01321		
Department - inpatient		14.7222	1.1117	.619	0.686 NS
- Out patient		14.1667	1.6065		
Child rank	First	14.3200	1.4059	1.994	0.094 NS
	Second	15.1111	1.1318		
	Third	14.0000	1.0328		
	Fourth	15.0000	1.4605		
Income - Enough		13.8333	1.4036	1.102	.370 NS
- not enough		14.6667	1.2934		
Child bearing					
- Mother, father		15.7500	1.1649	1.147	.347 NS
- Father		15.7500	1.1649		
- Mother		14.5455	1.2621		

*P< 0.05 significant ** P<0.01 highly significant, Not significant p >0.05

Table (6): Relation between children behavior Checklists and their socio demographic characteristics.

Personal characteristics		child behavior scale N=(60)		ANOVA (F)	p- value
		Mean	SD		
Age	6-12years	50.052	6.900	**3.872**	**0.001 ****
	12-18	46.363	6.622		
Gender	Male	47.828	7.602	**5.468**	**0.006 ****
	Female	49.920	5.929		
Educational level	Secondary E	52.0000	9.7068	**2.517**	**0.007 ****
	Preparatory E	47.6667	6.5880		
	Primary E	48.4444	6.0412		
	Illiterate	50.000	.00000		
Diagnosis	Acute lymphocytic leukemia	45.666	5.240	2.858	0.632 NS
	William's tumors	45.666	5.2408		
	Bone tumor	37.000	.0000		
	Leukemia	40.000	.0000		
Department	In patients	46.7500	5.6757	**6.201**	**0.008 ****
	Out patients	48.3889	7.1565		
Child rank	First	49.500	4.690	**1.991**	**0.032 ***
	Second	51.333	7.745		
	Third	46.375	68.370		
	Fourth	46.375	68.370		
Income	Enough	47.5000	5.2829	**2.370**	**0.010 ***
	Not enough	49.0000	7.3571		
Child bearing -	Mother, father	48.4000	6.3766	**4.390**	**0.003 ****
	- Father	52.0000	10.3923		
	-Mother	47.9091	6.3012		

*0.05significant ** P<0.01 highly significant, Not significant p >0.05

Discussion

Children submitted to invasive medical procedures undergo all types of psychological and physical stress, as do their families. Very often, the hospital environment to which the child is exposed is quite frightening, where this child's anxiety and behavioral cycle is altered. Thus, it is essential to understand the best ways to mitigate the negative alter-actions in these factors ***(Alfven (2019).***

This study is a descriptive study which aimed to assess stressors and coping patterns of children with newly diagnosed cancer during invasive procedures.

The result revealed that: Regarding to socio-demographic characteristics of children suffering from cancer **table (1)** the current study results revealed that more than one third of the studied children age ranged between 6-12 yrs., and approximately two thirds of them were ranged between (12-18 yrs.). These findings are congruent with those reported by ***Alfven (2019)*** in a study about "The co-variation of common psychosomatic symptoms among children from socio-economically differing residential areas", Pangladish who mentioned that more than one third of them their age range between 12-15years and more than half of the studied children with cancer are females. Also disagree with ***Walker & Greene (2019)*** who reported that the age of children with cancer were from 9:12years and slightly less than two thirds were males.

As regards to educational level the same table found that half of the studied children were at secondary education at school. This finding inconsistent with ***Chorpita et al. (2019)*** in a study about "Assessment of symptoms of DSM-IV anxiety and depression in children: a revised child anxiety and depression scale. Behavior Research and Therapy who stated that slightly more than one third of studied children were in preparatory school.

In the light of the present study results regarding to **figure (1)** showed that more than half of the studied children had unsatisfactory knowledge about invasive procedures followed by less than half of them had satisfactory knowledge. These findings were in congruence with ***Leung et al (2014)*** who founded that children ' had poor knowledge about cancer disease as a problem and how it affects the child health.

On investigating the child knowledge regarding to meaning, types and complication of invasive procedures, finding of more than two thirds of them had unsatisfactory knowledge, while more than three quarter of them had unsatisfactory knowledge related to invasive procedures. This finding is in consistence with study done by ***He et al. (2017)*** who confirmed that cancer children had poor knowledge about invasive procedures during treatment. From the researcher point of view these results may be due to lack of knowledge of children and not more information to answer some of the questions.

Concerning total summission domains in children behavior checklist namely withdrawn, somatic complain, anxious/ depressed, social problems, thought problems, attention problems, delinquent behavior, aggressive behaviors & other problems. It was observed from the current study **table (2),** more than half of studied children were sometimes had withdrawn and more than one third of them had anxious/depressed symptoms also less than one third of them had social problems, while more than one third of them had somatic complaints, more than two thirds of them were not had thought problems, meanwhile less than half of

studied children had attention problems, moreover great majority of them were not had delinquent behaviors and aggressive behaviors.

This study was supported by ***Desjardins (2019),*** entitled "Predicting social withdrawal, anxiety and depression symptoms in pediatric brain tumor survivors" and suggest that withdrawal may serve the risk for early behavioral and socio-emotional problems. Regarding the anxiety ***John et al. (2017)*** studied "behavioral and social outcome in adolescent survivors of childhood cancer" and concluded that, children with cancer receiving chemotherapy were not supportive of disability / stress of childhood chronic illness and suggest considerable psychologic hardiness.

Regarding to the distribution of the studied children suffering from cancer according to their total child's behavior checklist, **figure (2),** illustrated that less than two third of the studied children not exposed to stressors during invasive procedures, also more than one third of them sometimes had stressors and the rest of them often exposed to stressors. This result can be explained by ***Kato et al. (2015),*** in study entitled "Psycho-educational interventions with pediatric cancer patients: Effects of information and skills training on health-related outcomes" who reported that the communicative behaviors with children seem to play an important role in meeting the behavior, cognitive and affective needs of children suffering from cancer during invasive procedures. This reflects that, emphasis is placed on the affective side in which facilitating behaviors such as comforting; empathy, support, and touch are considered essential in caring for children with cancer during invasive procedure. The researcher believes that the communicative behaviors to the children suffering from cancer receiving parental injection lead to decrease the child's anxiety, maintain comfort, and decrease the stress.

Concerning to **table (3)** the finding of this study revealed that more than one third of the studied children never had cognitive coping, less than half of them usually had problem oriented coping and half of them usually had defensive coping. this result comes in the same line with ***Bull & Drotar (2015)*** who studied Coping with cancer in remission: stressors and strategies reported by children and adolescents and said that according to three factors were generated and defined. These three factors, cognitive coping, problem-oriented coping and defensive coping, explained 40% of the total variance with factor loadings that ranged from 0.31 to 0.71. From the researcher point of view, it may be a valuable measurement for use in developing a cognitive and problem-oriented coping program design so continued evaluation is required to verify applicability of the instrument in a variety of cultures.

This result disagree the studu done by ***Chen (2017)*** entitled the study of resilience and life adaptation among adolescent survivors of brain tumors in Taiwan displayed the computed correlation matrix and indicated that two factors (cognitive coping and problem-oriented coping) were highly correlated with the resilience. The defensive coping factor was positive correlated with total anxiety and physiological anxiety, worry and social anxiety subscales. From the researcher point of view may be assessing coping strategies in children with cancer may be useful for guiding intervention development and helping children use cognitive coping and problem -oriented coping during stressful events.

In the current study, it was observed that less than half of the studied children were usually coping followed by more than one third of them were never coping and less than quarter of them every time coping during invasive procedure **figure (3)**. This result was supported with ***Schultz et al. (2016)*** in a study about studied behavioral and social outcomes in adolescent survivors of childhood cancer. Who mentioned that the extracted three factors, which matched the confirmatory factor analysis (CFA) results and had indices that indicated a good fit and all results were considered significant and coping.

Concerning the relations between children's coping domain (cognitive, problem oriented & defensive) and their age **table (4),** it was represented that there was a highly statistically significant difference between children cognitive and problem oriented coping domains and their age.

These findings were in accordance with a study carried out by ***Hildenbrand et al. (2019),*** entitled as "A mixed methods assessment of coping with pediatric cancer" in USA, it was mentioned that, children were participant in study aged from six to twelve years, diagnosed with cancer within the last year and currently undergoing treatment by invasive procedures, cognitively capable of assenting and completing the interview and found highly statistical significant difference between cognitive, education and support and their age group. From the researcher point of view, age with education, experience and support of children can be provided to help him to promote higher levels of problem oriented coping and social support, which are associated with better adjustment to pediatric cancer.

Regarding the relation between children sociodemographic characteristics and their knowledge regarding invasive procedures **table (5),** the present study found that, there was statistically significant difference between children knowledge and their age, also there was highly statistically significant difference between children knowledge and their diagnosis. These findings were supported with study done by ***Staky and Birni (2017)*** in titled "Procedural preparation and support as a standard of care in pediatric oncology" and found that, pediatric patients with cancer undergoing many repeated and invasive medical procedures that is often painful and highly distressing, so the older children suffering from cancer should receive developmentally appropriate preparatory information about invasive medical procedures. From the researcher point of view, the older children had knowledge more than young one due to their ability to read and understand all information about invasive procedures.

Concerning to relation between child' behavior and their socio demographic characteristics **table (6)** it was indicated that, there was highly statistically significant difference between child behavior checklist and their age, gender, educational level, department and child bearing. The young children showed more aggressive behavior compared to older children. Also there was statistically significant difference between child' behavior checklist and their rank and income.

This finding is highly supported with ***Lahey (2018)*** who reported that, younger children was higher rate of aggression behavior than older children, older children like adolescent suffering from cancer and treat by chemotherapy must cope with the stress related to the

complication of invasive procedure and cancer disease. And these findings disagree with (***(Wong & Galbraith, 2017)*** who clarified that consequently dealing with the illness may be more difficult and older children may be at greater risk for adjustment psychological problems such as behavioral changes**.** From the researcher's point of view, with increasing age, educational level, the children can learn more and more or own a lot of knowledge and applying educational training program may increase children's' knowledge and can cope with all stressors.

Conclusion

Based on findings of the current study, it can be concluded that:

Children newly diagnosed with cancer mainly posed to:(a)-Many psychological stressors such as withdrawn, somatic, anxious /depressed, thought disturbance and (b)- socially stressors such as: attention disturbances, delinquent behavior, aggressive behavior, and other stressors problems during invasive procedure, and there are different coping patterns as cognitive coping, problem oriented coping and defensive coping, but children mainly never can cope with these stressors during invasive procedures. In addition, there are statistically significant difference between stressors, coping patterns and children characteristics.

Recommendation

- Establish training programs for children with newly diagnosed cancer with different coping strategies and how to use.
- Encourage using non pharmacological therapy during invasive procedures as play therapy or distraction therapy.

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