Post-traumatic Stress Responses and Coping Strategies among Parents of Children with Leukemia

Doha Abd elbaseer Mahmoud [(1)], Hend Ahmed Mostafa[(2)], Shimaa Salah Elsayed[(3)]

(1) Assistant professor of Psychiatric and Mental Health Nursing, Faculty of Nursing, Benha University, Egypt.
(2) Assistant professor of Psychiatric and Mental Health Nursing, Faculty of Nursing, Benha University, Egypt.
(3) Lecturer of Psychiatric and Mental Health Nursing, Faculty of Nursing, Benha University, Egypt.
***Email:** dohamahmoud85@yahoo.com

Abstract

Background: Different people with stressful events like leukemia have different post-traumatic stress responses. **Aim of the research:** The aim of this research was to assess the relation between post-traumatic stress responses and coping strategies among parents of children with leukemia. **Design:** This research used a descriptive correlational research design. **Setting:** oncology clinic at a specialist pediatric hospital in Benha City, Kaluobia Governorate and 57357 Hospital for Pediatric Oncology and the hematology, served as the research's sites. **Sample:** One hundred parents of children with leukemia were included in the purposive sample. **Tools:** *A structured interviewing questionnaire sheet is the first tool. Tool (11): Post-traumatic stress responses Scale and Tool (111): Coping Patterns Scale.* **Results:** More than half of the studied parents in the research had high levels of post-traumatic stress responses, according to the findings. Additionally, over 50% of the studied parents in the research exhibit low levels of overall coping patterns. **Conclusion:** Among the studied parents under research, there was a highly statistically significant negative correlation between their overall post-traumatic stress responses and their total coping patterns. **Recommendation:** Psycho-educational programs ought to be incorporated into regular nursing interventions for parents of children with leukemia to lessen parental stress and enhance coping mechanisms.

Keywords: Coping strategies, leukemia, Post-traumatic stress

Introduction

Leukemia is a type of cancer that affects the tissues in the bone marrow of large bones that make blood. Unnatural white blood cells flood the body from the afflicted bone marrow. The ability to combat infection that distinguishes adult white blood cells is absent from these cells. Additionally, there is a decrease in the production of platelets, which help stop bleeding, and red blood cells, which carry oxygen. The most prevalent kind of malignancy in childhood is leukemia. In children under the age of 15, it accounted for almost 30% of all cancer diagnoses. There are two types of leukemia: acute and chronic. Children are more likely to have acute lymphoblastic leukemia than chronic leukemia **(American malignancy society, 2023).**

Post-traumatic stress symptoms are a response to parents of children after diagnosis of a chronic illness. These previous states differ from person to person; acute symptoms manifest within a month of the traumatic event, while chronic symptoms take years to manifest. These symptoms lead to significant challenges in relationships, the workplace, and social settings **(Preston et al., 2024).**

Post-traumatic stress is known as excessive concern and tension about a parent's role and interactions with their children. Parents of children with leukemia need to be shielded from harm—both physical and psychological. Depending on how severe their child's illness is parents may experience varying levels of stress. For example, parents who receive a leukemia diagnosis for their children will likely experience great stress, which will be made worse if their child experiences pain, receives chemotherapy injections, or is admitted to the hospital. As a perceived psychological state brought on by a stress reaction, depression and anxiety may arise after prolonged exposure to stress **(Uludağ et al., 2023).**

When their children are diagnosed with cancer, parents may experience feelings of depression. Constant sadness, anxiety, or empty mood; pessimism or despair; guilt or helplessness; poor energy; difficulty

concentrating and making decisions; insomnia or oversleeping are all signs of depression. Parents feel a great sense of loss when their child is diagnosed with leukemia. They worry that they won't be able to handle the severity of the family's problems and are ill-equipped to deal with the possibility of a child dying **(Waters et al., 2023).**

Coping strategies are seen as a means of reducing the emotional, psychological, and physical strains associated with difficult life circumstances. Coping patterns are defined as constantly changing behavioral and cognitive strategies to deal with specific demands, either internal or external, that are greater than the individual's capacity. In order to improve their performance in handling stressful situations, such as chronic and life-threatening illnesses, parents of affected children should focus on appropriate coping patterns (adaptive behaviors); these strategies are crucial for preserving one's mental and psychological well-being **(Budimir et al., 2023).**

Moreover, an individual's activities and responses to control and manage psychological issues brought on by the illness, like anxiety, stress, and depression, are referred to as adaptive behaviors. It is important to highlight these habits, especially for families raising children with leukemia **(Biabani et al., 2024).** Moreover, effective coping is a significant source of creating a sense of well-being and psychological adjustment in situations that are stressful, which has an impact on the physical and psychological health of affected children. Effective coping strategies lower the disease's negative impacts, and one's capacity to cope with environmental and internal stresses or develop these behaviors improves **(Subardhini et al., 2021).**

Psychiatric and mental health nurses before and after treatment, play a significant role in helping parents of children with leukemia manage their psychological stress and coping mechanisms. In order to reduce stress and anxiety and to enhance coping skills to accept their child's circumstances, they ought to offer a psychoeducational program. Additionally, support parents in attending group therapy sessions with other parents who have a comparable child with leukemia and in using stress management techniques. Additionally, they help parents regain or enhance their coping skills, analyze dysfunction and progress, and support their overall health and mental wellness ***(*American Psychiatric Association, 2023*).***

Significance of the Research

The primary cause of death for children and adolescents is cancer, according to a 2024 World Health Organization report. Approximately 500,000 children and adolescents between the ages of 1 and 19 are affected by cancer each year. Leukemia, brain malignancy, lymphoma, and solid tumors are the most prevalent forms of juvenile malignancies. Over 80% of children with cancer are cured in high-income nations. Less than 30% of children in low- or middle-income nations are healed. With 35.2% of all childhood malignancies occurring in Egypt, childhood leukemia is the most common childhood malignancy. There were 4,325 new leukemia cases altogether, and 3,762 people died from the disease **(National Malignancy Institute, 2022).**

Parents of children with leukemia are vital members of their health care teams, served as primary nurse for them. Due to their socioeconomic level and a lack of clinical resources and government support, they may face more challenges in caring for their children than typical parents, including higher therapy fees and childcare challenges. All of these problems could negatively affect child care, making parents more stressed and having an effect on their life (**Fertelli & Tuncay, 2023).** Therefore, the aim of the current research was to assess the relationship between post-traumatic stress responses and coping strategies among parents of children with leukemia.

Aim of the research:

The aim of this research was to assess the relationship between post-traumatic stress responses and coping strategies among parents of children with leukemia.

Research question:

This can be achieved through the following questions:

Q1: What are the levels of post-traumatic stress responses among parents of children with leukemia?

Q2: What are the levels of coping strategies among parents of children with leukemia?

Q3: Is there a relation between post-traumatic stress responses and coping strategies among parents of children with leukemia?

Subject and Methods

Research Design:

This research used a descriptive correlational design.

Research Setting:

The research was conducted at a specialist pediatric hospital in Benha City, Kaluobia Governorate, at the hematology and oncology clinic. The out-patient clinic consists of two pediatric general examinations and treatment clinic and a pediatric oncology hospital (57357). There is a 40-bed leukemia unit at 57357 Hospital with a separate area for both sexes.

Research Subject:

Sample size

One hundred parents of children with leukemia (20 from a specialist pediatric hospital in Benha City and 80 from the 57357 hospital for pediatric oncology) made up the sample. The following formula was used to determine the sample size: n = (z2×p× q)/D2 for 80% power and 95% confidence level.

Sample technique

A purposeful sample of 100 parents whose children received a leukemia diagnosis based on the diagnosis made by the medical team.

This subject was selected based on the following inclusion criteria of the parents:

Inclusion criteria:

- Both sexes.
- Consent to take part in the research.
- Be the child's primary caregiver for at least six months.
- Free from a history of mental and neurological disorders.

Tools for Data Collection:

The following three instruments were used to gather data in order to fulfill the research's objectives:

Tool one: Structured Interview Questionnaire Sheet:

In order to evaluate the following components, researchers created a questionnaire based on a scientific evaluation of the literature. It was formatted in Arabic and written in a language suitable for the participant's comprehension level:

Part 1: Socio-demographic data for parents of children with leukemia:

It had six items: parents' age, sex, marital status, educational level, occupation, and place of residence.

Part 2: Clinical data for children with leukemia:

It had five items: the number of years of illness, onset of disease, the period of treatment, the number of hospitalizations, and the current course of treatment.

Tool two: - Post-Traumatic Stress Responses Questionnaire:

- This questionnaire was originally developed by **Mohammed (2006)** to evaluate responses to PTS, this questionnaire consisted of four subscales (31 questions) to evaluate the following:
- The first subscale, consisted of 11 questions, was developed to evaluate an individual's feelings toward themselves.
- Eight questions made up the second subscale, which was developed to assess individual feeling toward society.
- The third subscale, which consisted of seven items, was developed to evaluate individual feeling on the future.
- The fourth subscale was developed to evaluate how illness affected day-to-day activities (5 questions).

Scoring system:

A scale of 1 to 3 is used to rate each item; 1 represents a low response, 2 a neutral response, and 3 a high response.

(1-31) = Low response to traumatic stress, (32-62) is the moderate PTS response & High response to PTS = (63–93).

Tool three: Coping Patterns Scale:

This scale was developed by **Jalowiec and Power (1981)** and adapted by the researchers. This 40-item measure was designed to evaluate the coping strategies employed by parents of children with leukemia. This was separated into two subscales: the problem-oriented coping scale (15 items) and the emotional-oriented coping patterns scale (25 items). Every item has a score between 0 and 3, where 0 means never, 1 means sometimes, 2 means often, and 3 means always. **The total scoring system** of the coping patterns was be summed, calculated and classified in three levels as following:

1. < 50 % (<42 degrees) = Low coping patterns.
2. 50-<70 % (42-<58 degree) = Moderate coping patterns.
3. ≥70 % (≥58 degrees) = High coping patterns.

2- Operational design

This research's operational design comprised a preparatory phase, validity, reliability, a pilot study, and fieldwork.

Preparatory phase:

In order to gain a comprehensive understanding of the research topic, the first phase of the research involved a review of previous, current, local, and international pertinent literature as well as a variety of studies that were related to the topic. Additionally, textbooks, articles, magazines, and internet searches were used. This enabled the researchers to understand the magnitude and seriousness of the issue and develop the required techniques for gathering data.

Content Validity:

To ensure content validity, the instruments were translated into Arabic and then retranslated into English after being assessed for item appropriateness and concept measurement by five psychiatric and mental health nursing specialists. They believed that no modifications had been made.

Reliability of tools:

Cronbach's Alpha was used to assess the research tools' internal consistency.

Tools	Cronbach's Alpha
PTS Responses Scale	0.879
Coping Pattern Scale	0.857

Pilot study:

To ascertain the tools' suitability, the research's viability, and the amount of time needed to collect the data, a pilot research was conducted. It was carried out on 10% of the total sample (ten parents) who participated in the research's final sample, or, underwent the procedure. Based on the pilot research's findings, no modifications were necessary.

Fieldwork /procedure of data collection:

After introducing themselves to the parents under research and briefly outlining the purpose of the research to those who consented to participate, the researchers started gathering data. Every participant underwent an individual interview and evaluation. Each parent received the questionnaire, which they completed under the researchers' supervision. Parents who couldn't read well were helped by the researchers to write their responses. It took roughly ten minutes to complete the first instrument, the PTS Responses scale, and fifteen to twenty minutes to complete the second, the coping pattern scale.

Additionally, the duration of the data collection process was roughly three months, commencing in early September 2024 and ending at the end of November 2024. At a specialist pediatric hospital in Benha City, the researchers collected 20 questionnaires during the first month's morning shift, which ran from 9 am to 12 pm on Wednesdays, five parents each day. The researchers collected 80 questionnaires from 57357 hospitals throughout the course of the previous two months while working the morning shift on Wednesday and Thursday from 9 a.m. to 12 p.m. 40 parents a month; 10 parents a week.

3- Administrative design

Administrative Approval:

The Ethics Committee of Benha University's Faculty of Nursing provided the primary formal clearance letter (approval number: **REC-PSYN-P37**). The suggested research will subsequently be carried out by the director of Benha City's specialized pediatric hospital and the 57357 Hospital for Pediatric Oncology, after being approved by the dean of Benha University's college of nursing. The research could be conducted with the least

amount of opposition if its objectives and design were apparent.

Ethical Considerations:

The research employed strategies to ensure that moral concerns like informed consent and confidentiality were taken care of. The participants' names were replaced by numbers on locked sheets to maintain confidentiality. Every participant received notice that the data they submitted throughout the research would be kept private and used exclusively for statistical analysis and after the trial was over. Every parent was made aware that their involvement in the research was entirely voluntary and that they might discontinue at any time.

4-Statistical design

The Statistical Package for Social Science (SPSS) version 22 was used. Data was reported using descriptive statistics in the form of numbers and percentages, as well as means and standard deviations. Qualitative variables were compared using the chi-square test. For quantitative data, the pearson correlation coefficient (r) was utilized for correlation analysis, and a degree of significance was determined. A p-value of less than 0.05 was deemed statistically significant and p-value $p \leq 0.001$ was deemed highly statistically significant.

Results

Table (1) displays the socio-demographic data of the parents under research. With a mean age of 35 ±9.77, it shows that 32% of the parents in the research are 40 years old, 60% are female, 80% are married, 38% have intermediate education, 64% are unemployed, and 70% live in rural areas.

Table (2) illustrates the clinical characteristics of the children with leukemia**.** It reveals that 66% of the children have had their illness for less than a year, 54% have less than five years of disease onset, 70% have less than a year of treatment, 64% have been hospitalized one to three times, and 52% are receiving chemotherapy at the moment.

Figure (1) shows that, the frequency distribution of the parents under research according to the total PTS responses subscales. It shows that 60% of them have high levels of future-focused PTS responses. Additionally, a high degree of PTS responses toward oneself and society is present in 55% and 50% of the parents in the research, respectively. Furthermore, 42% of them exhibit high levels of PTS responses toward the effects of disease on activities of daily living.

Figure (2) displays the frequency distribution of the parents under research according to the total level of PTS responses. 52 % of the parents in the research exhibit high levels of PTS responses, according to the report. Additionally, moderate levels of PTS responses are present in 26% of them. However, a minor percentage of parents (22%) exhibit PTS responses.

Figure (3) shows the frequency distribution of the parents under research according to their overall coping patterns subscales**.** More than half of the parents in the research exhibit low levels of both total emotional-oriented coping and total problem-oriented coping (57.0% and 56.0%, respectively).

Figure (4) mentions the frequency distribution of the studied parents according to their overall level of coping patterns scale. It shows that low levels of overall coping patterns are present in 55.0% of the parents in the research. Additionally, 30.0% of them exhibit moderate levels of overall coping patterns. However, 15.0% of the parents in the research exhibit a high degree of overall coping patterns.

Table (3) illustrates the relationship between a parent's socio-demographic characteristics and total level of post-traumatic stress responses. It demonstrates that, there is a highly statistically significant relation between the total level of post-traumatic stress responses among the studied parents and marital status. Furthermore, there is a statistically significant relation between parents' post-traumatic stress response levels and their age, sex, and educational level.

Table (4) demonstrates the relationship between children's clinical data and total parental post-traumatic stress response levels. It illustrates that, there is a highly statistically significant relation between total post-traumatic stress response levels among the studied parents and their children's number of years of illness, onset of disease, period of treatment for the disease, and number of hospitalization.

Table (5) clarifies the relationship between patents' socio-demographic characteristics and

coping patterns. It indicates that the total level of coping pattern among the studied parents and their age and sex have a highly statistically significant relationship. Additionally, there is a statistically significant relation between the total level of coping patterns and their marital status and occupation.

Table (6) shows the relationship between children's clinical data and total coping patterns. It demonstrates a highly statistically significant relation between the parents' total level of coping patterns and the onset of their children's illnesses, times of hospitalization and current treatment. Additionally, there is a statistically significant relation between parents' total coping patterns and the number of years that children have been ill.

Table (7) demonstrates the correlation between total post-traumatic stress responses and coping patterns among the studied parents. It becomes clear that, among the parents under study, there is a highly statistically significant negative correlation (p-value < 0.01) between the total level of post-traumatic stress responses and the total level of coping patterns.

Table (1): Frequency distribution of the studied parents according to their sociodemographic data (n=100).

Socio-demographic data	No.	%
Age (years)		
Less than 25 years	10	10.0
25 - < 30 years	30	30.0
30 - < 35 years	12	12.0
35- < 40 years	16	16.0
40 years and more	**32**	32.0
Mean ± SD	**35 ± 9.77**	
Sex		
Male	40	40.0
Female	**60**	60.0
Marital status		
Married	**80**	80.0
Widowed	10	10.0
Divorced	10	10.0
Educational level		
Illiterate	32	32.0
Basic education	22	22.0
Intermediate education	**38**	38.0
University education	8	8.0
Occupation		
Employee	8	8.0
Free business	28	28.0
Not working	**64**	64.0
Residence		
Rural	**70**	70.0
Urban	30	30.0

Table (2): Frequency distribution of the children with leukemia according to their clinical data (n=100).

Clinical data of the children with leukemia	No.	%
The numbers of years of disease?		
Less than1 year	**66**	66.0
1 - < 5 years	30	30.0
5 years or more	4	4.0
Onset of disease		
Less than 5 years	**54**	54.0
5- < 10 years	18	18.0
10- < 15 years	14	14.0
15- < 18 years	14	14.0
The period of treatment for the disease		
Less than 1 year	**70**	70.0
1- < 2 years	26	26.0
2 years or more	4	4.0
Number of hospitalizations		
1-3 times	**64**	64.0
4-6 times	30	30.0
7 times or more	6	6.0
Current treatment		
Follow up or drugs	8	8.0
Radiotherapy	4	4.0
Chemotherapy	**52**	52.0
Mixed therapy	36	36.0

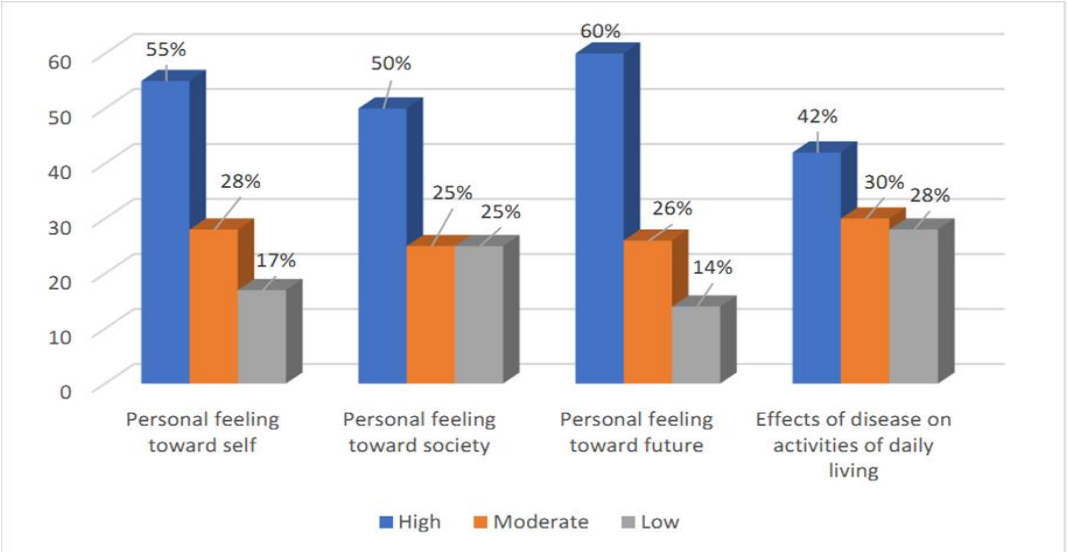

Figure (1): Frequency distribution of the studied parents based on total post-traumatic stress responses subscales (n=100).

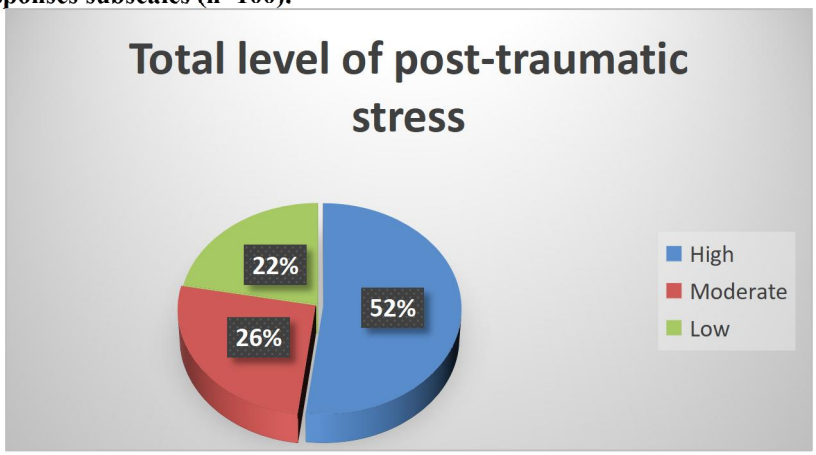

Figure (2): Frequency distribution of the studied parents based on total level of post-traumatic stress responses (n=100).

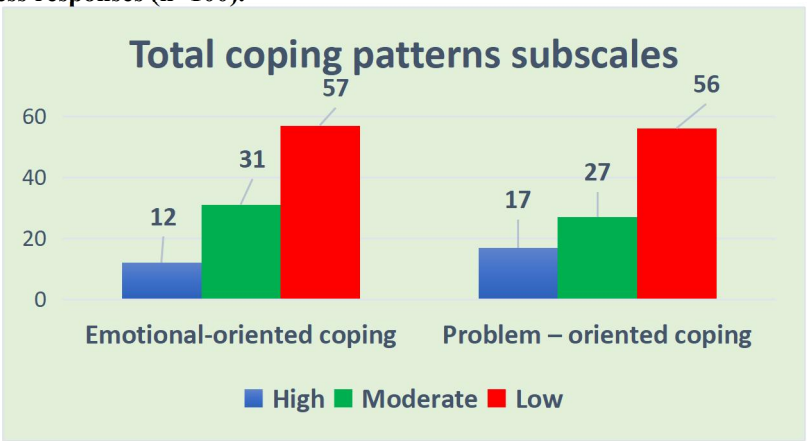

Figure (3): Frequency distribution of the studied parents according to their total coping patterns subscales (n=100).

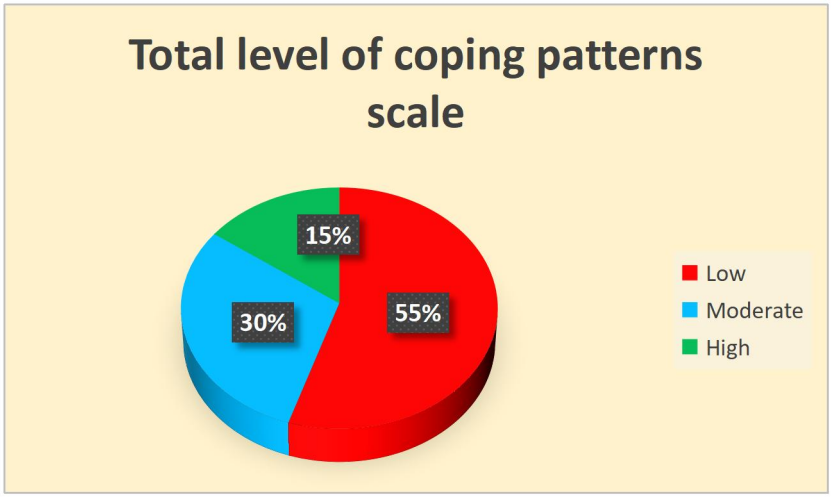

Figure (4): Frequency distribution of the studied parents based on their total level of coping patterns scale (n=100).

Table (3) Relationship between parents' socio-demographic data and total level of post-traumatic stress responses (n=100)

Socio-demographic data of the studied parents	PTS responses level				X^2	P-Value
	No	Low	Moderate	High		
Age (years)					16.6	<0.05*
- Less than 25 years	10	2	2	6		
- 25 - <30 years	30	2	18	10		
- 30 - < 35 years	12	2	4	6		
- 35 - < 40 years	16	4	4	8		
- 40 years or more	32	0	12	20		
Sex					6.7	<0.05*
- Male	40	2	22	16		
- Female	60	8	18	34		
Marital status					20.4	<0.01**
- Married	80	8	40	32		
- Widowed	10	0	0	10		
- Divorced	10	2	0	8		
Educational level					15.4	<0.05*
- Illiterate	32	6	16	10		
- Basic education	22	2	6	14		
- intermediate education	38	0	14	24		
- University education	8	2	4	2		
Occupation					5.61	>0.05
- Employee	8	0	4	4		
- Free business	28	2	12	14		
- Not working	64	8	24	32		
Residence					1.05	>0.05
- Rural	70	6	30	34		
- Urban	30	4	10	16		

(*) Statistically significant at p<0.05. (**) highly statistically significant at p<0.001.

Table (4): Relationship between children' clinical data and total level of parental PTS responses (n=100)

Clinical data of children with leukemia	Total level of PTS responses				X^2	P –value
	No.	Low	Moderate	High		
The numbers of years of disease						
Less than 1 year	66	8	34	24	15.5	<0.01**
1 - < 5 years	30	2	6	22		
5 years or more	4	0	0	4		
Onset of disease						
Less than 5 years	54	10	26	18	19.7	<0.01**
5- < 10 years	18	0	6	12		
10- < 15 years	14	0	6	8		
15- < 18 years	14	0	2	12		
The period of treatment for the disease						
Less than 1 year	70	10	34	26	7.12	<0.01**
1- < 2 years	26	0	6	20		
2 years or more	4	0	0	4		
Numbers of hospitalization						
1-3 times	64	8	32	24	1.3	<0.01**
4-6 times	30	2	8	20		
7 times or more	6	0	0	6		
Current treatment						
Follow up or drugs	8	2	2	4	12.4	>0.05
Radiotherapy	4	0	4	0		
Chemotherapy	52	2	22	28		
Mixed therapy	36	6	12	18		

(**) highly statistically significant at p<0.001.

Table (5): Relationship between parents' socio-demographic data and total level of coping patterns (n=100)

Socio-demographic data of studied parents	Total level of coping patterns				X^2	P-Value
	No	Low	Moderate	High		
Age (years)					30.8	<0.01**
- Less than 25 years	10	8	0	2		
- 25 - < 30 years	30	8	20	2		
- 30 - < 35 years	12	10	2	0		
- 35 - < 40 years	16	8	4	4		
- 40 years or more	32	16	16	0		
Sex					10.8	<0.01**
- Male	40	12	24	4		
- Female	60	38	18	4		
Marital status					12.9	<0.05*
- Married	80	34	38	8		
- Widowed	10	6	4	0		
- Divorced	10	10	0	0		
Educational level					10.4	>0.05
- Illiterate	32	14	14	4		
- Basic education	22	14	6	2		
-intermediate education	38	20	18	0		
- University education	8	2	4	2		
Occupation					12.7	<0.05*
- Employee	8	2	6	0		
- Free business	28	10	14	4		
- Not working	64	38	22	4		
Residence					2.4	>0.05
- Rural	70	34	32	4		
- Urban	30	16	10	4		

(*) Statistically significant at p<0.05. (**) highly statistically significant at p<0.001.

Table (6) Relationship between children' clinical data and total coping patterns (n=100)

Clinical characteristics	Total level of coping patterns.				X^2	P –value
	No	Low	Moderate	High		
The numbers of years of illness					12.2	.016*
- Less than 1 year	66	26	32	8		
- 1 - < 5 years	30	20	10	0		
- 5 years or more	4	4	0	0		
Onset of disease					22.9	.001**
- Less than 5 years	54	16	30	8		
- 5- < 10 years	18	12	6	0		
- 10- < 15 years	14	12	2	0		
- 15- < 18 years	14	10	4	0		
The period of treatment for the disease					8.82	.066
- Less than 1 year	70	30	32	8		
- 1- < 2 year	26	16	10	0		
- 2 years or more	4	4	0	0		
Numbers of hospitalization					15.2	.004**
- 1-3 times	64	24	32	8		
- 4-6 times	30	20	10	0		
- 7 times or more	6	6	0	0		
Current treatment					17.5	.008**
- Follow up or drugs	8	4	2	2		
- Radiotherapy	4	0	4	0		
- Chemotherapy	52	28	24	0		
- Mixed therapy	36	18	12	6		

(*) Statistically significant at p<0.05. (**) highly statistically significant at p<0.001.

Table (7): Correlation between total level of post-traumatic stress responses and coping patterns among the studied parents (n=100).

Variables	Total coping patterns	
	r	p-value
Total post-traumatic stress responses	-0.257	0.000**

Discussion

Acute stress disorder, anxiety, sadness, and other psychological issues are among the many psychological problems that parents of children with childhood leukemia may encounter. The parents have displayed symptoms of stress since the child was diagnosed with acute leukemia, which is a major barrier that lowers their quality-of-life **Fertelli & Tuncay, (2023).** Therefore, the aim of the current research was to assess the relationship between post-traumatic stress responses and coping strategies among parents of children with leukemia.

In terms of the parents' sociodemographic data, the results of the current research showed that, with a mean ± SD of 35 ± 9.77, less than one-third of the parents were 40 years of age or older. In terms of sex, more than half of them were female, which might be because mothers are seen as the children' primary caretakers in Egyptian culture and are therefore expected to take on more caregiving responsibilities than fathers. The research's approach, which evaluated factors for parents, may have contributed to the result that the majority of parents were married.

Furthermore, the results of this research revealed that over one-third of the parents under investigation had an intermediate level of education. One possible explanation for the reason that less than two-thirds of parents were unemployed is that a greater percentage of the mothers in the research were housewives who lived in rural areas. Less than three-quarters of them lived in rural areas, which may be explained by the fact that they did so with their families and benefited emotionally from rural living and Benha Pediatrics' Hospital serves a significant portion of the nearby villages.

Regarding the clinical features of the leukemia-afflicted children, the current research discovered that more than half of the children had less than five years of disease initiation, and two-thirds of the children had less than a year of sickness; this result contradicted **Vercasson et al., (2023)**, who stated that less than ten percent of the children in the research had been unwell for less than a year. Additionally, the current research discovered that more than half of their current therapies were chemotherapy, fewer than two-thirds had been hospitalized one to three times, and less than three-quarters had been treated for less than a year. This result was in line with that of **El Desouky et al. (2022),** who discovered that over half of the children were undergoing chemical therapy and that less than two-thirds had been hospitalized one to three times.

More than half of the parents in the research had high levels of post-traumatic stress responses toward the future and self, according to subscales measuring total PTS responses. The researchers believe this could be related to the impact of treatment modalities that cause feelings of loss and depression or the impact of the disease on the parents' psychological state. The study was in accordance with **Leeuwen, (2021)** stated that, approximately two-thirds of the parents who were assessed exhibited significant levels of post-traumatic psychological stress linked to impaired role function, feelings toward the future, and self-esteem.

In the context of the total level of post-traumatic stress, more than half of the parents in the current research indicated high levels of post-traumatic stress responses. The researchers claim that leukemia is a deadly illness with a poor prognosis; the parents in the research may be anxious about the malignancy spreading to another location, the likelihood of losing an organ, or the difficulties of chemotherapy and radiation therapy or death.

Oliveri et al., (2022) who found that most of their research group had psychological stress symptoms ranging from severe to moderate, corroborated the findings of the current investigation. However, the findings of this research contradicted those of **Mathew et al., (2022),** who claimed that a small percentage of parents of leukemic pediatrics and their family members have been found to have malignancy-related PTS responses, and that these responses are positively correlated with a number of distress indicators.

The current research revealed that over half of the parents under investigation had low levels of overall emotional-oriented coping, as measured by the emotional-oriented coping subscale. Given Egyptians' strong religious and cultural ties, the researchers believe that the findings may be related to the importance of spirituality in effectively managing illness-related issues. These results aligned with those of **Kermansaravi et al., (2023)** who found that most parents in the research had low levels of overall emotional-oriented coping.

Regarding the problem-oriented coping subscale, the results of the present research showed that the parents under research had a low level of the subscale overall. The researchers speculate that this might be because the parents are attempting to learn about the illnesses of their children or are not receiving enough information from medical professionals to manage their care and needs. These results were in line with those of **Abhilasha et al., (2022)** who discovered that over two-thirds of the participants in their research were aware of coping mechanisms for their children' issues.

Regarding the **total** coping patterns scales, the results of the current research showed that more than half of the parents under research had low levels of total coping patterns. According to the researcher, these findings could be the result of the parents' stressful experience with leukemia and their failure to use coping mechanisms effectively. This is particularly problematic because the disease is chronic and requires frequent hospitalization and follow-up, so it's critical to give these parents enough information about how to manage the illness. A research by **Kermansaravi et al., (2019)** confirmed these findings, showing that over half of the parents in the research exhibited poor coping mechanisms for their pediatrics' illness. These results were also in line with those of **Biswas et al., (2024),** who found that over two-thirds of the parents in their research had scores below average on all three coping behavior categories.

Regarding the relation between the socio-demographic data of the parents and the total level of PTS responses, the current research discovered a highly significant relation between the parents' marriage status and the total PTS responses they had. The researchers speculate that this result may be related to the fact that widowed or divorced parents have more responsibilities; couples help each other to bear the burden of child care and treatment more than divorced or widowed parents do. This result was in line with that of **Bemis et al., (2022)**, who discovered a highly statistically significant relation between the parents' marital status and their overall stress level. On the other hand, **Zarina et al., (2022)** found no statistically significant relation between the respondents' marital status and their overall level of PTS responses.

Additionally, the findings of this research showed a statistically significant relation between the age, sex, and educational level of parents and their level of PTS responses. The research suggests that this finding may be explained by the fact that mothers take on more responsibilities for the home and children than fathers do, and that younger parents may bear a heavier burden. **McCarthy et al., (2021)** found a statistically significant relation between parents' stress levels and their age and sex, which is in line with this finding. This finding contradicts **Zarina et al., (2022)** findings that there was no statistically significant relation between the parents' age, sex, and educational attainment and their overall stress level.

The present research showed that there was a highly statistically significant relationship between the total PTS responses level among the patents and their children' number of years of illness, the onset of their disease, the length of time they spent in the hospital, and the duration of their treatment, based on the relationship between the children' clinical characteristics and the total PTS responses

level. According to the researchers, this outcome could be the result of bad emotions and feelings linked to increased parental stress brought on by malignancy diagnosis. Additionally, prolonged treatment and frequent hospital stays might increase stress.

This finding is consistent with that of **Tremolada et al., (2022),** who discovered a highly statistically significant relationship between the parents' overall stress level and the number of years their children had been hospitalized and illness. Additionally, the study done by **Cinar et al., (2024)** supported our result, showing a highly statistically significant relationship between the parents' overall stress levels and the commencement of their children' illnesses, the length of time they spent receiving treatment, and the length of time they spent in the hospital.

Regarding the relationship between the sociodemographic data of the parents and their overall coping strategies, the present research showed a highly statistically significant relation between the parents' age and sex and their overall coping strategies. The researchers speculate that this outcome may be the consequence of parents' ignorance of leukemia and associated complications, which make their everyday lives more difficult and, consequently, alter their coping mechanisms. Furthermore, mothers are primarily responsible for managing dads, households, and pediatrics. This result is in line with that of **Mondal et al., (2023),** who showed a highly statistically significant relation between the parents' age and sex and their overall coping strategies. This finding contradicts that of **Rohmah et al., (2022),** who found no statistically significant relation between the parents' age and sex and their overall coping strategies.

Additionally, the results of the current research showed a statistically significant relation between the marital status and occupation of parents and their overall coping habits. According to the research, this result may be related to the fact that marriage changes the lifestyle of each pair, which can have an impact on their coping mechanisms and the cost of malignancy treatment, which necessitates additional funding. This finding is in line with that of **Ganjiwale et al., (2022),** who found a statistically significant relation between parents' marital status and employment and their degree of coping behaviors. However, this finding contrasts with that of **El Desouky et al., (2022),** who found no statistically significant relationship between the parents' marital status and employment and their overall level of coping behaviors.

According to the relationship between children's clinical characteristics and total coping patterns, the current research showed a highly statistically significant relationship between the parents' total coping patterns and their children' onset of disease, hospitalizations, and current treatment. The research found that various treatment modalities can have disparate effects on the physical, social, and psychological well-being of parents and children, and that repeated hospitalization may have a negative impact on parents' coping strategies.

This outcome is consistent with the findings of **Salem et al., (2022),** who found a highly statistically significant correlation between the number of years that the children in the research experienced illness and their parents overall coping strategies. Our findings were also corroborated by a research by **Mondal et al., (2023)** which found a highly statistically significant relationship between the parents' overall coping strategies and the children' disease onset, hospital stays, and current therapy.

The findings indicated that there was a statistically significant relation between the number of years that children had been ill and the parents' overall coping strategies. According to the researcher, parents' coping mechanisms suffer when the number of years of illness increases since it adds to the care burden and stress. This finding is consistent with that of **McCarthy et al. (2021),** who found a statistically significant relation between the number of years that children had been ill and the parents' overall coping strategies. This finding runs counter to **Muskat, (2018)** discovery that there was no statistically significant relation between the length of years their children were ill and their parents overall coping strategies.

Furthermore, our research revealed a highly statistically significant negative correlation between the parents' overall parental stress and coping strategies. The researchers believe that this discovery may be explained by the fact that a significant portion of parents experienced anxiety, stress, and depressed symptoms during childhood malignancy. Parents' coping strategies were negatively impacted by mental health issues. This finding is in line with that of **Yildirim et al., (2021)** and **Haya et al., (2019),** who found a highly statistically significant negative correlation between the parents' overall coping strategies and their responses to post-traumatic stress.

Conclusion

It is possible to draw the conclusion that more than half of the parents in the current research exhibit high levels of post-traumatic stress responses and low levels of overall coping strategies. Furthermore, there is a highly statistically significant negative correlation between the parents' overall post-traumatic stress responses and their total coping strategies.

Recommendations:

In the light of these findings of the present research, it was recommend that:

- Psycho-educational programs ought to be incorporated into regular nursing interventions for parents of children with leukemia to lessen parental stress and enhance coping mechanisms.
- Increasing parents' knowledge about leukemia, giving them coping mechanisms to improve their quality of life, and holding counseling sessions for parents of children with the disease to improve their well-being.
- Organizing religious and spiritual support groups to lessen psychological issues. This could provide parents of leukemia-stricken children the strength to overcome obstacles and a more positive outlook on the future.
- Additional research is required to evaluate and improve palliative care, recreational advancement, and the psychological states of children with leukemia.
- Additional research with a bigger probability sample to generalize the findings.

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