Effect of Positive Coping Skills Practical Guidance Program on Hemodialysis Children and Caregiver's Satisfaction

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KEYWORDS
Positive Coping Skills, Practical Guidance Program, Children, hemodialysis.

ABSTRACT

Background: Hemodialysis imposes significant physical and psychosocial stressors on children and their caregivers, necessitating the development of positive coping skills to regulate emotions and reduce stress. Effective interventions are critical to enhancing emotional resilience and coping mechanisms.

Aim of the study: This study aimed to determine the effect of positive coping skills practical guidance programs on hemodialysis children and their caregiver's satisfaction.

Research approaches: A quasi-experimental study was conducted on 60 children undergoing hemodialysis at Zagazig University Children's Hospital, Egypt, from April to September 2023. Data were collected using four tools: an interview questionnaire for demographic data, the Simple Mental Health Pain Scale to assess emotional distress, the Kids Coping Scale (KCS), and a positive coping skills checklist.

Results: The mean age of the studied children was 13.4±3.6 years. Problem-focused coping was practiced by 16.70% of the studied children before intervention, while increased to 81.70% after intervention. Emotional-focused problem was practiced by 88.30% post intervention. Avoidant coping was practiced by 85% pre intervention, while this percentage decreased to 20% post intervention. Through follow up, 83.3% of studied children practiced emotional focused coping, 78.30% practiced problem focused coping, and 23.30% practiced avoidant coping. Moreover, the mean score of mental health pain among hemodialysis children decreased from 5.95±1.8 to 3.28±1.6, and decreased in follow-up to 3.95±1.5 with high statistical significance ($P < 0.001$). All caregivers reported their satisfaction with the program.

Conclusion: There were statistically significant differences among children before and after the application of program. The positive coping skills practical guidance program has a positive effect on hemodialysis children as the program shifted the children from avoidant coping to approach coping and decreased their mental pain. All caregivers reported their satisfaction as well as their children with the program.

Recommendation: Children receiving hemodialysis require more psychological programs and practical assistance on positive coping skills to reduce mental pain and to reduce the burden of hemodialysis on children.

Introduction

Chronic renal disease in children (CKD) is a chronic illness that has a detrimental impact on children's general quality of life [1]. Birth defects, genetic illnesses, infections, trauma, nephrotic syndrome, systemic diseases, urine obstruction or reflux, and systemic diseases can all lead to kidney damage in children [2]. Children and young people with CKD now have a much higher survival rate due to advancements associated with modern medicine, including dialysis and kidney transplantation [1]. The life of hemodialysis children is altered by chronic and long-term dialysis, which usually causes a rise in psychological disorders and a decline in the meaning of life. Due to the difficulties and limitations of the treatment, hemodialysis patients may experience feelings of lack of control and hopelessness in addition dissatisfaction, anger, despair, and disappointment [3].

CKD is characterized by significantly deteriorating quality of life for both caregivers and children, including low emotional functioning, psychological and social health. Also, children experience significant psychosocial obstacles, which related to either the dialysis treatment such as negatively impacted school functioning because of long dialysis sessions, or others which usually affect clients with chronic disease as

peer difficulties and poor emotional functioning [4]. Mental pain is often described as the distress associated with symptoms, making it a crucial aspect of any diagnosis that includes 'significant clinical distress' as a diagnostic criterion [5].

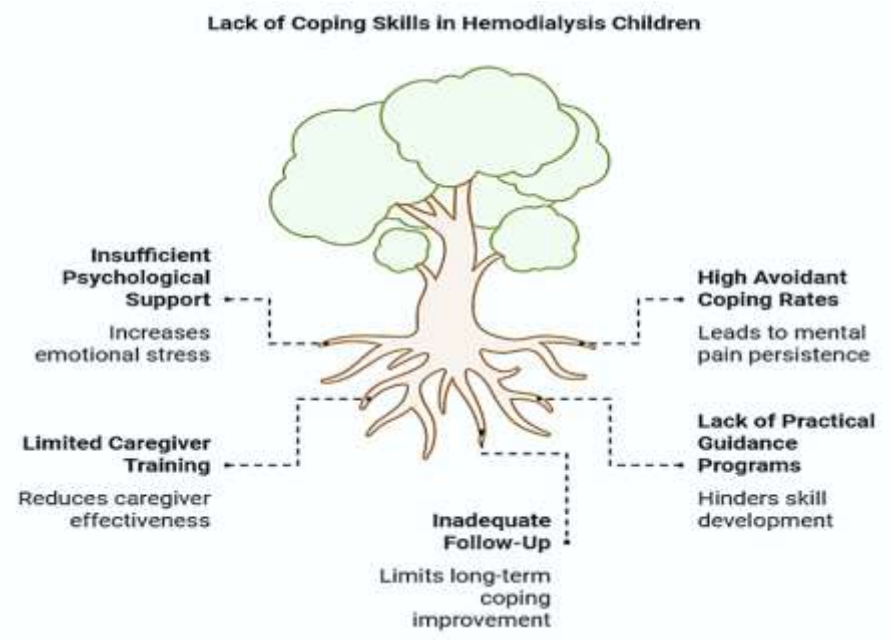
Regardless of other factors like hopelessness or depression, mental discomfort is a risk factor for suicide behavior [6, 7]. Furthermore, mental pain has been linked to physical problems like migraines as well as other mental disorders like obsessive-compulsive disorder, post-traumatic stress disorder, and borderline personality disorder [8]. Mental pain is infrequently measured in clinical trials or assessed in clinical practice, despite mounting evidence that it should be routinely assessed [9]. Dialysis patients' mental health can be adversely affected by pain, which can also raise anxiety and depressive symptoms [10]. Moreover, Chevance et al. [9] described mental pain as "unbearable" and similarly to "torture," positioned it as the fifth most significant consequence in depression. This emphasizes the necessity to manage mental pain as a target. According to Jadia et al. [11], to raise these patients' quality of life, adequate management of their psychological problems is required including their ability to cope. coping strategies are the thoughts and actions employed to deal with the demands of a stressful situation, both internal and external. The term "coping " refers specifically to the conscious and intentional mobilization of behaviors, as opposed to "defense mechanisms," which are adaptive subconscious or unconscious responses that also seek to either accept or lessen stress. When individuals face a stressor, they adopt various responses known as "coping styles." These styles are a set of relatively stable traits that shape how a person reacts to stress. They tend to remain consistent over time and across different circumstances [12].

Three different types of coping were identified by Ricco et al. [13] active primary coping (problem focused coping), which involves making direct changes to the source of stress or one's own response to it; active secondary coping (emotional focused strategies – social support focus); and distraction, positive thinking, and reframing acceptance as ways to cope with stress. The third form, is negative and avoids making any attempt to change or manage stress, disengagement (avoidant focused). Ganjiwale et al. [14] stated that teaching coping strategies can enhance quality of life. These strategies include problem-focused coping, which involves active planning and support from religion and other sources, active emotional coping, this includes reducing avoidant emotional coping, which includes self-blame, denial, distraction, behavioral disengagement, and substance use, as well as, positive reframing, venting, acceptance, emotional support and humor. Effective coping strategies can influence adjustment and all aspects of mental health. It has been discovered to be linked to a stronger sense of self, an improved outcome, a higher quality of life, and the need for resilience in children with long-term illnesses [13]. Coping-skilled children are more resilient, less likely to experience depression or develop unhealthy coping mechanisms, less likely to experience anxiety symptoms, more likely to succeed academically, more able to handle stress, less likely to experience toxic stress, and less likely to experience physical health problems as a result of altered immune response [15]. Hodg [16] highlighted several benefits, including enhanced self-esteem as children gain confidence by overcoming challenges, improved emotional regulation, and better problem-solving skills, enabling even young children to approach life's puzzles like mini-detectives. Additional benefits include reduced anxiety and stronger relationships, as children learn to express themselves and communicate with others in healthier, more constructive ways.

Significant of the study

Many different emotions and moods are generated by the mental pain, stress, anxiety, and depression brought on by a chronic illness. A life-threatening illness can lead a person to feel generally irritable, angry and frustrated about the issues the sickness has produced, as well as helpless and hopeless [17]. These represent significant problems to address as there is an evidence that psychological issues can have a detrimental impact on both medical and psychosocial outcomes [18]. The way that patients as well

as their caregivers' perceptions of their medical condition, the severity of the symptoms they experience, and psychological suffering that comes with it can all be significantly affected by teaching them proper coping techniques [19].



Aim of the study:

This study aimed to determine the effect of positive coping skills practical guidance programs on hemodialysis children and their caregiver's satisfaction. This aim was fulfilled through objectives of the study

Objectives of the study:

- Assess mental pain of hemodialysis children pre and post the program
- Determine coping strategies used by hemodialysis children pre and post the program
- Assess the practiced coping skills that are used by hemodialysis children pre and post the program.
- Appraise the effect of positive coping skills practical guidance on hemodialysis children.
- Evaluate caregivers' satisfaction with the positive coping skills practical guidance program.

Research Hypothesis

Application of positive coping skills practical guidance program on hemodialysis children will improve their coping and caregiver satisfaction.

Subjects and Methods

Study design

A quasi-experimental design was conducted with a practical guidance program. There were three periods of data collection: Pre-post and follow up three months later to determine the stability and changes in practicing positive coping skills.

Sample and Setting

A purposive sample consisting of 60 children in the hemodialysis unit at Zagazig University Hospitals, Egypt, comprised the potential participants. The capacity of the unit is 15 beds. The unit serves daily about 30 children on hemodialysis, divided into two groups, one group in the morning shift and the other group in the evening shift. Each group dialysis three times a week. The unit operates six days a week.

Measures (Tools for data collection):

Four tools were used to collect data for this study.

Tool I: An interview questionnaire

It was used to collect demographic data of children and their parents such as age, gender, education level, income level, etc.

Tool II: A Simple Mental Health Pain Scale

The Simple Mental Health Pain Scale developed by Soo [20], and is a visual analogue numerical scale designed with an engaging and child-friendly graphic that incorporates emojis. The teaching and familiarization process for children takes approximately 30 minutes. This scale is utilized to evaluate negative and painful internal feelings before and after the implementation of a positive coping skills training intervention program. Children use the scale to rate their current level of mental health pain and distress, providing a tangible measure of their emotional state. This tool is also valuable for tracking progress in utilizing coping skills and serves as a resource for monitoring mental health symptoms. Participants are encouraged to document their mental health pain ratings in daily journals or charts, facilitating both self-awareness and ongoing assessment. The scale's practical application highlights the importance of recognizing and naming emotions as a step toward managing and alleviating distress effectively.

Tool III: Kids Coping Scale (KCS)

The Kids Coping Scale (KCS), developed by Spirito et al. [21], is a clinical checklist designed to evaluate cognitive and behavioral coping strategies in children and adolescents. The tool includes two versions: one for younger children (ages 7–12) with 15 dichotomous (yes/no) items and another for adolescents (ages 13–18) consisting of 11 items rated on a 4-point Likert scale. The KCS assesses the use and perceived effectiveness of both adaptive and maladaptive coping strategies, including distraction, social withdrawal, cognitive restructuring, self-criticism, blaming, problem-solving, emotional regulation, wishful thinking, social support, and resignation. The tool is available in multiple languages, including a validated and reliable Arabic version, allowing its use in diverse cultural contexts.

Subscales of the KCS:

Avoidant Coping: Measures strategies such as distraction (items 1, 2), social withdrawal (items 3, 4), wishful thinking (items 12, 13), and resignation (item 15).

Active Coping: Includes problem-focused and emotion-focused strategies such as cognitive restructuring (item 5), problem-solving (items 8, 9), positive emotional regulation (item 11), and seeking social support (item 14).

Negative Coping: Captures maladaptive responses, including self-criticism (item 6), blaming

others (item 7), and negative emotional regulation (item 10), accounting for 16.8% of the total variance.

The KCS provides a structured approach to understanding coping behaviors in children and adolescents, enabling tailored interventions to support their psychological resilience.

Tool IV: Positive Coping Skills Checklist for kids

Positive Coping Skills Checklist for kids was adapted by the researchers. The checklist was used to detect different skills of coping that are used by children pre and post the practical guidance program and through follow-up. Children were trained and guided to practice these skills to manage the internal and external demands of specific stressful situations. Participants rated the extent to which each skill was utilized during a stressful encounter on a 4-point Likert scale, ranging from 0 (does not apply or not used) to 3 (used extensively).

Reliability of the tools

A Simple Mental Health Pain Scale:

The reliability of the Simple Mental Health Pain Scale was evaluated using the internal consistency method, with a Cronbach's alpha coefficient of 0.836, indicating a good level of reliability.

Kids Coping Scale (KCS):

The KCS demonstrated low to moderate internal consistency and showed similar levels of correlation with related constructs such as self-esteem and parent-reported strengths and difficulties. Despite these limitations, the scale effectively captures a clear problem- and emotion-focused framework, making it appropriate for children aged 7 and older. Identified weaknesses and recommendations for improving the KCS were noted for future development.

Positive Coping Skills Checklist for Kids:

The reliability of the Positive Coping Skills Checklist for Kids was determined using the internal consistency method, with an excellent Cronbach's alpha coefficient of 0.920.

Validity of the Tools:

All tools underwent content validity evaluation by experts in pediatric nursing, nephrology, and community health. They were assessed for clarity, relevance, comprehensiveness, usability, and practicality. Validation was achieved through a consensus among the majority of reviewers.

Scoring and Interpretation Information

The three overarching coping styles are outlined below.

Problem-Focused Coping (Items 2, 7, 10, 12, 14, 17, 23, 25): This style is characterized by active coping, use of informational support, planning, and positive reframing. High scores suggest that the individual employs strategies aimed at changing the stressful situation, demonstrating psychological resilience, practical problem-solving skills, and a proactive approach, all of which are predictive of positive outcomes.

Emotion-Focused Coping (Items 5, 9, 13, 15, 18, 20, 21, 22, 24, 26, 27, 28): This style involves venting, emotional support, humor, acceptance, self-blame, and religion. A high score indicates coping strategies aimed at managing emotions related to the stressful situation. High or low scores do not have a uniform association with psychological health but can help identify the respondent's overall coping style.

Avoidant Coping (Items 1, 3, 4, 6, 8, 11, 16, 19): This style is characterized by self-distraction, denial, substance use, and behavioral disengagement. High scores suggest efforts to disengage physically or cognitively from the stressor, while low scores typically reflect adaptive coping strategies.

In addition to the three primary subscales, scores are also provided for 14 specific coping facets, which allow for a detailed examination of adaptive or maladaptive coping styles. These facets include:

- **Active Coping** (Items 2 & 7) – Problem-Focused
- **Use of Informational** Support (Items 10 & 23) – Problem-Focused
- **Positive Reframing** (Items 12 & 17) – Problem-Focused
- **Planning** (Items 14 & 25) – Problem-Focused
- **Emotional Support** (Items 5 & 15) – Emotion-Focused
- **Venting** (Items 9 & 21) – Emotion-Focused
- **Humor** (Items 18 & 28) – Emotion-Focused
- **Acceptance** (Items 20 & 24) – Emotion-Focused
- **Religion** (Items 22 & 27) – Emotion-Focused
- **Self-Blame** (Items 13 & 26) – Emotion-Focused

Field work

Data collection was conducted six days per week, with researchers working mornings from 9:00 AM to 12:00 PM for three days and afternoons from 12:00 PM to 3:00 PM on the other three days. The subjects were divided into 4 groups; each group consisted of 15 children with their caregivers. Every 5 children were met by a researcher from the three to train them how to practice positive coping skills during the hemodialysis session. At the end of hemodialysis session, the researchers perform the post evaluation with respect for tired children and those with signs of fatigue to be met for post-test before the following session. The periods of preparing and implementation lasted 3 months and 3 months over before follow up.

There were three phases to this project: the preparatory phase, the implementation phase, and the reassessment phase.

During the **preparatory phase**, an official letter of support was obtained from the medical and nursing directors of the hospital. This letter confirmed their agreement with the study's objectives and authorized data collection and program implementation. Additionally, the preparation phase involved creating a handbook that outlined the positive coping skills to be taught to children undergoing hemodialysis and their parents. Translation the content of the handbook from English to Arabic was also done and more

colored pictures were added to attract children attention and clarify the practiced techniques. In the preparatory phase, the schedule and objectives of the educational program were established, teaching methods were chosen, and media were finalized. Next, participants completed the demographic tool and Simple Mental Health Pain Scale to measure negative and painful internal alleviating feelings and pre implementation of positive coping training intervention program.

The **implementation phase** lasted 10 weeks. The children were divided into groups of five children with one researcher. Each child received a handbook that had the adapted positive coping skills (translated into Arabic).

The **follow up phase** is the second evaluation using the same tools three months after the implementation period. It began after all children attended all hours of the program. Content of the Practical Guidance for Positive Coping Skills Intervention Sessions (Fig. A).

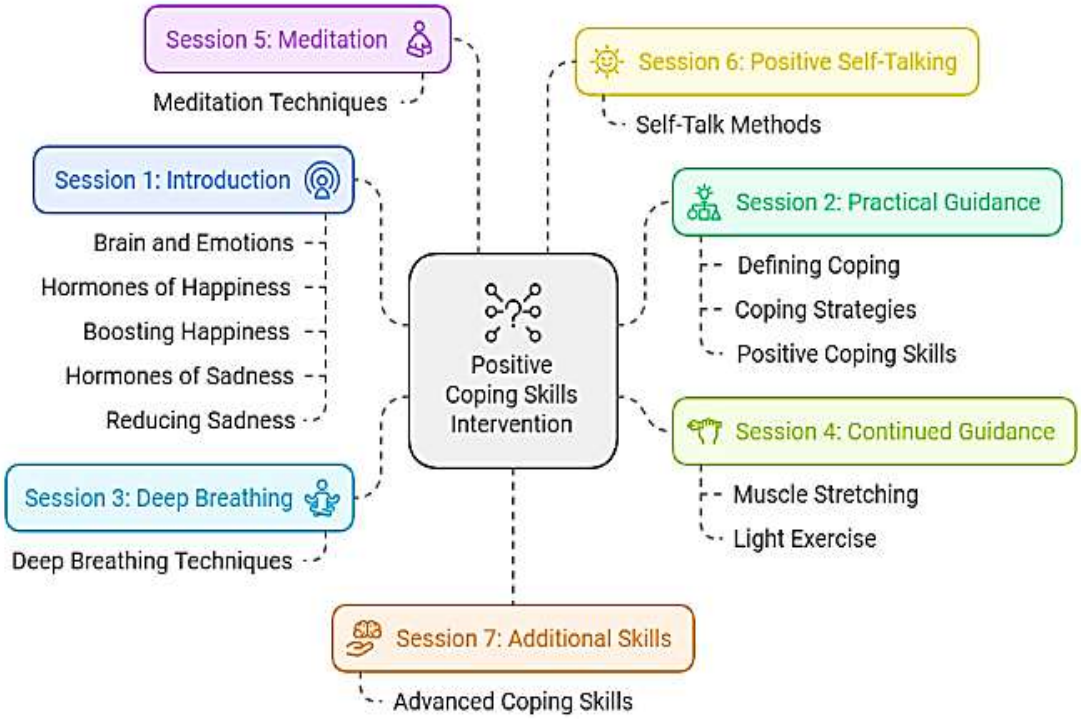


Fig. A shows Content of the Practical Guidance for Positive Coping Skills Intervention Sessions

Data processing and analysis

Initially, the sample was characterized in terms of both absolute and relative frequencies. A descriptive statistical analysis of the data related to coping behaviors was then conducted. The data were analyzed using SPSS version 20. For parametric data, Student's t-test, one-way ANOVA (F test), and paired t-test were applied. For non-parametric data, the Mann-Whitney test was used. Chi-squared (χ^2) tests were employed for qualitative variables. Spearman's correlation analysis was conducted to assess the strength and direction of associations between variables p-value.

Results

Table 1. clarifies the characteristics of studied children. It was found that 61.7% of the studied children aged from 12 to 18 years with mean of age13.4 ± (3.6) years, 53.3% were male and all of them from rural area. Concerning birth order, 38% were the third child in their families. Also, it was found that 65% were not committed to school while 31.7% of them dropped out of school. Regarding duration of dialysis, 48.3% of the studied children undergoing hemodialysis less than 5 years, 38.4% undergoing hemodialysis between 5 to less than 9 years, while 13.3% undergoing hemodialysis for more than 9 years with mean 5.1± (3.6) years. It was revealed from the same table that 85% had no family history of renal disease or dialysis while 15% had positive family history. 78.3% didn't know causes of renal failure as reported by the studied children. Also, 63.3% of the studied children had negative consanguinity between parents, while 36.7 % had positive consanguinity.

Characteristics of the studied parents were showed in Table 2. It was found that 65% of the children' mother aged from 35 to less than 45 years with the mean of age 35.3± (12.02) years while 68.3% of the children father aged from 40 to less than 50 years with mean 41.6± (13.8) years. Concerning mother education, it was found that 51.7% were illiterate or read and write while 8.3%, 35% and 5% were finished their primary school, secondary school and Bachelor's degree. Also, 96.7% of them didn't work. Additionally, 45% of the children' fathers were illiterate or read and write while 1.7%, 5%, 40% and 8.3% had primary school, preparatory, secondary school and Bachelor's degree. Also, 95% had work and 65% of them their income was insufficient.

Table 3. represents the distribution of the studied children according to mental health pain scale throughout program phases. It was found that a marked improvement in children perception to mental health pain throughout study phases with highly statistically significant difference at ($P< 0.001$). Regarding severe mental health pain, 26.7% had severe pain before implementation of the program. This percentage declined to 3.3% and 5% after implementation of the program and at follow up phase. Concerning moderate mental health pain, 58.3% of the studied children experienced moderate mental health pain before implementation of the program while, this percentage declined to 25% and 28.3% after implementation of the program and at follow up phase. The same table also revealed that 15% reported mild mental health pain before implementation of the program compared to 71.7% and 66.7% after implementation of the program and at follow up phase.

Table 4. indicates the distribution of the reported –practiced coping skills among the studied children throughout study phases. It was found a marked improvement in children's reported practiced of coping skills at post implementation of the program and at follow up phase with highly statistically significant difference at ($p<0.001$) throughout study phases.

Distribution of studied children according to coping skills was illustrated in fig 1. It was found that only 1.66% and 3.3% of the studied children read a book and read magazine before implementation of the program these percentages slightly increased post implementation of the program (15% and 15%) and at follow up (8.3% and 6.6%). On the other hand, 98.3% spent most of their time on phone before implementation of the program this percentage decreased to 75% and 67% after implantation and at follow up. The same figure also revealed that 13.3% and 5% draw or color and listen to calm music before the program compared to (95% and 87%) after the program and (80% and 83.3%) at follow up.

Fig. 2 outlines coping skills reported practice by the studied children. It was found a marked improvement in children's reported practiced of coping skills at post implementation of the program and at follow up phase. It was observed that no one of the studied children do light exercise, play with cubes, puzzle or clay and close their eyes, relax and imagine before implementation of the program, while after the program this percent improved to (88.3%, 96.7% and 93%) and slightly decreased at follow up to (78.3%, 93.3% and 86.7). Also, it was found that only 5% of the studied children learning something new to entertain their time. e.g. beadwork and handicrafts before the program compared to 68.3% and 55% after implementation and at follow up.

It was found that only 5%, 0% and 5% of the studied children performed a deep breath...as if I were going to blow, count to ten in a low, calm voice until I calm down and stretching exercise as coping skills before implementation of the program, these percentages improved to 97%, 98% and 93% after the program while slightly decreased at follow up to 93.3%, 95% and 90%. On the other hand, it was found that 65% the studied children Ask Allah forgiveness before the program compared to 98.33% and 93.33% after implementation and at follow up phases (Fig. 3).

Distribution of the studied children according to their practice of coping skills was showed in fig. 4. It was found that only 3.33% practice Yoga before implementation of the program, this percentage increased to 95% and 93.33% after the program and at follow up phases. Also, 0% and 1.66% practiced learn new language from you tube to form friends and learn something new e.g. chess to participate in competition before the program compared to (89.7% and 76.66%) and (83.33% and 70%) after implementation of the program and follow up phases. On the other hand, it was found that the studied children practiced these skills before the program "use positive affirmations, write things make me happy and searching the internet for solutions to my problems" with percentages (26.66%, 1.66% and13.3%), these skills were improved after implementation and follow up phases with percentages (92%, 98.33% and 89.7%) and (88%, 93% and 41.7%).

Distribution of studied children related total domains of coping skills, it was found that 85% of the studied children practiced avoiding coping before the program while 20% and 23.30% practiced avoiding coping after the program and at follow up phase. Concerning emotional focused skills, only 13.30% of the studied children practiced it before the program compared to 88.30% and 83.30% after the program and at follow up phase. Also, it was found that 16.70%, 81.70% and 78.30% of the studied children practiced problem focused coping skills before, after and at follow up phase of the program (Fig. 5).

Feelings of studied children pre the program as reported by their caregivers was presented in Fig. 6. It was found that 91.70% of the studied children felt happy to a small degree as reported by their caregivers, 66.70% felt sad to a big degree, 86.60% felt frustrated to a big degree, 45% felt anxious to a medium degree, while 80% were angry to a big degree and 61.70% were worried to a big degree as reported by their caregivers before implementation of the program. Fig. 7 portrays feelings of studied children after the program as reported by their caregivers was. It was found that 58.30% of the studied children were happy to a medium degree, 78.30% were sad to a small degree, 58.30% felt frustrated to a small degree, 41.70% felt anxious to a medium degree, while 48.30% were angry to a big degree and 53.30% were worried to a small degree as reported by their caregivers after implementation of the program.

Fig. 8 illustrates distribution of caregivers according to their evaluation to the program. When the children' caregivers were asked to evaluate the program, it was found that 63.30 % mentioned that the program was very good, 25% reported that the program was excellent, as well as 8.30% reported the program was good while 3.40% mentioned the program was accepted. Satisfaction of the studied children and their caregivers with the program was presented in Fig. 9. It was found that 93.30% of the studied children and 100% of their caregivers were satisfied with the program.

Correlation between mental health pain and coping skills practiced by the studied children at post intervention and follow-up was illustrated in Table 5. It was found there was a positive correlation between mental health pain and practiced avoiding coping skills at post intervention and follow up phase (which mean when the studied children practice avoiding this increase occurrence of mental health pain). Also, it was found there was a negative correlation between mental health pain and practiced problem focused and emotional focused coping skills at post intervention and follow up phase (which mean when the studied children practice problem focused and emotional focused coping skills this decrease occurrence of mental health pain) with high statistically significant difference ($P< 0.001$).

Table 1 Characteristics of studied children (n=60)

Items	N	%
Age:		
6 - <12	23	38.3
12 - 18	37	61.7
Mean (sd) 13.4 ± (3.6)		
Gender:		
Male	32	53.3
Female	28	46.7
Residence		
Rural	60	100
Birth order:		
First	15	25
Second	16	26
Third	23	38
Fourth	3	5
Fifth	3	5
Education:		
Not attend school	2	3.3
Not committed to school	39	65
Drop out of school	19	31.7
Duration of hemodialysis:		
< 5	29	48.3
5 – 9	23	38.4
> 9	8	13.3
Mean (sd) 5.1± (3.6)		
Family history of renal diseases:		
Yes	9	15
No	51	85
Causes of renal failure?		
I don't know	47	78.3
Atrophy	3	5
Systemic lupus erythematosus	2	3.3
Congenital anomalies	4	6.7
Renal syndrome	1	1.7
primary glomerulonephritis	1	1.7
Familial/metabolic	2	3.3
Consanguinity		
Yes	22	36.7
No	38	63.3

Table 2 Characteristics of studied parents (n=60)

Items		n	%
Mother age:			
25 - <35		10	16.7
35 - <45		39	65
45 - 55		11	18.3
Mean (sd).	35.3± (12.02)		
Father age:			
30 – <40		4	6.7
40 – <50		41	68.3
50 - 60		15	25
Mean (sd).	41.6± (13.8)		
Mother education:			
Illiterate / read and write		31	51.7
Primary school		5	8.3
Secondary school		21	35
Bachelor's degree		3	5
Father education:			
Illiterate / read and write		27	45
Primary school		1	1.7
Preparatory		3	5
Secondary school		24	40
Bachelor's degree		5	8.3
Mother work:			
Work		2	3.3
Not work		58	96.7
Father work:			
Work		57	95
Not work		3	5
Income:			
Sufficient		21	35
Insufficient		39	65

Table 3 Distribution of studied children according to mental health pain scale (n=60)

Mental health pain	Pre		Post		Follow-up		Test p. value
	n	%	n	%	n	%	
Mild	9	15	43	71.7	40	66.7	16.232 0.000**
Moderate	35	58.3	15	25	17	28.3	
Severe	16	26.7	2	3.3	3	5	
Mean (sd)	5.95 (1.8)		3.28 (1.6)		3.95 (1.5)		

high significant <0.001

Table 4 Distribution of studied children related coping skills (n=60)

		Pre		Post		Follow-up		Test P value
		n	%	n	%	n	%	
Avoidant Coping								
Self-distraction	**Yes**	51	85	14	23.3	16	26.7	13.789
	No*	9	15	46	76.7	44	73.3	0.000**
Substance use	**Yes**	0	0.0	0	0.0	0	0.0	11.888
	No*	60	100	60	100	60	100	0.000**
Denial	**Yes**	45	75	7	11.7	9	15	12.415
	No*	15	25	53	88.3	51	85	0.000**
Behavioral disengagement	**Yes**	39	65	6	10	10	16.7	12.024
	No*	21	35	54	90	50	83.3	0.000**
Problem focused								
Active coping	**Yes***	7	11.7	51	85	47	78.3	14.012
	No	53	88.3	9	15	13	21.7	0.000**
Use of informational support	**Yes***	8	13.3	50	83.3	50	83.3	7.664 0.002**
	No	52	86.7	10	16.7	10	16.7	
Positive reframing	**Yes***	10	16.7	52	86.7	49	81.7	13.119
	No	50	83.3	8	13.3	11	18.3	0.000**
Planning	**Yes***	5	8.3	47	78.3	45	75	13.025
	No	55	91.7	13	21.7	15	25	0.000**
Emotional focused								
Emotional support	**Yes***	11	18.3	48	80	46	76.7	12.544
	No	49	81.7	12	20	14	23.3	0.000**
Venting	**Yes***	9	15	47	78.3	47	78.3	9.662
	No	51	85	13	21.7	13	21.7	0.001**
Humour	**Yes***	10	16.7	52	86.7	51	85	13.824
	No	50	83.3	8	13.3	9	15	0.000**
Acceptance	**Yes***	7	11.7	49	81.7	46	76.7	16.200
	No	53	88.3	11	18.3	14	23.3	0.000**
Self-blame	**Yes***	18	30	54	90	52	86.7	12.773
	No	42	70	6	10	8	13.3	0.000**
Religion	**Yes***	26	43.3	59	98.3	57	95	14.501
	No	34	56.7	1	1.7	3	5	0.000**

high significant <0.01

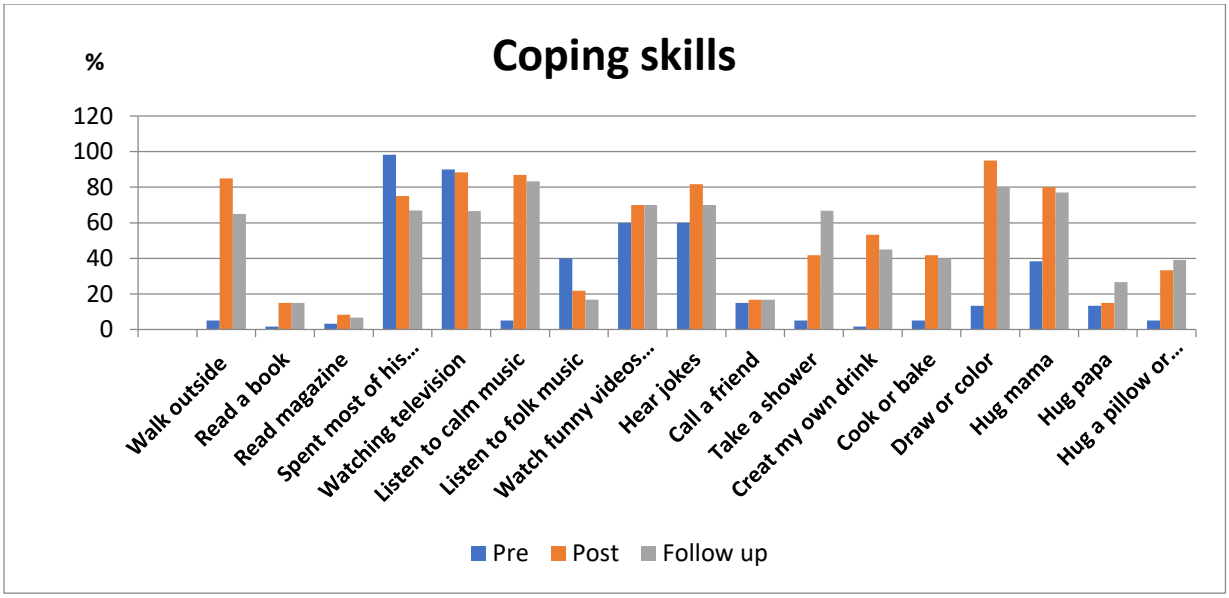


Fig. 1 Distribution of studied children according to coping skills (n=60).

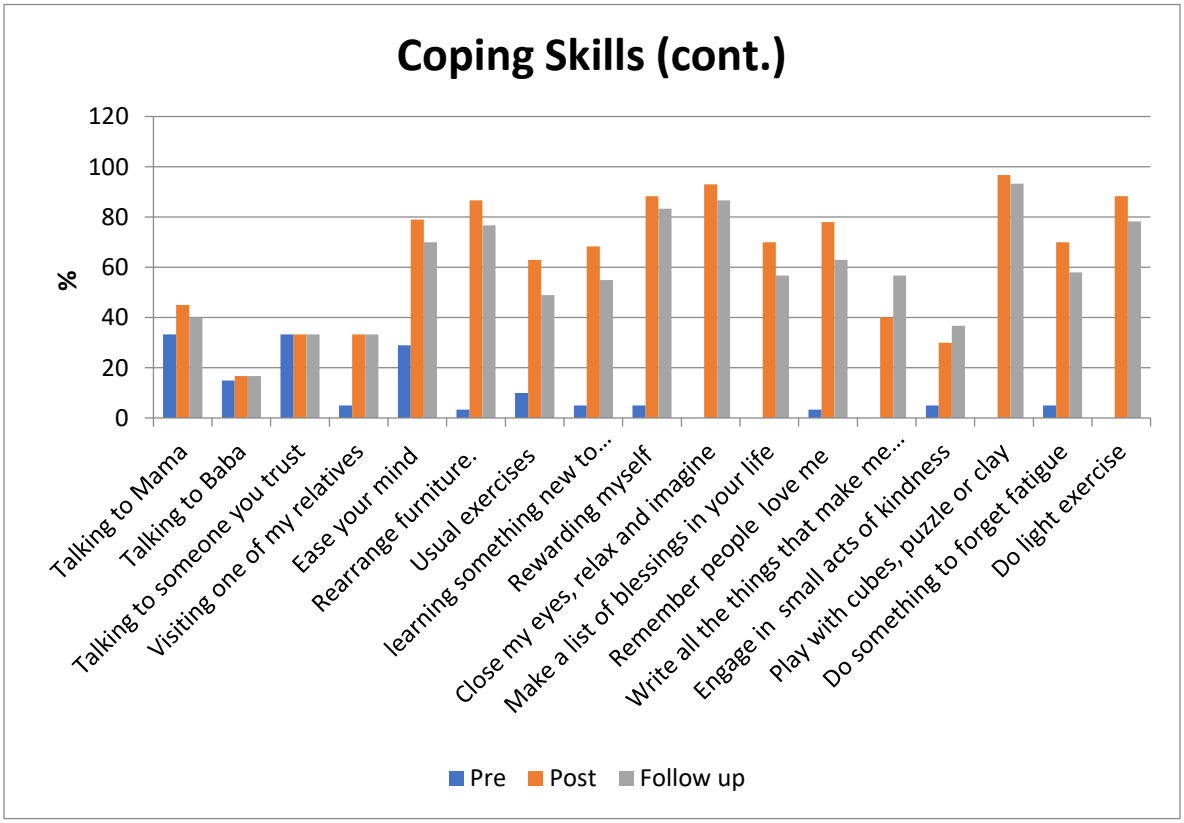


Fig. 2 Distribution of studied children according to coping skills (n=60)

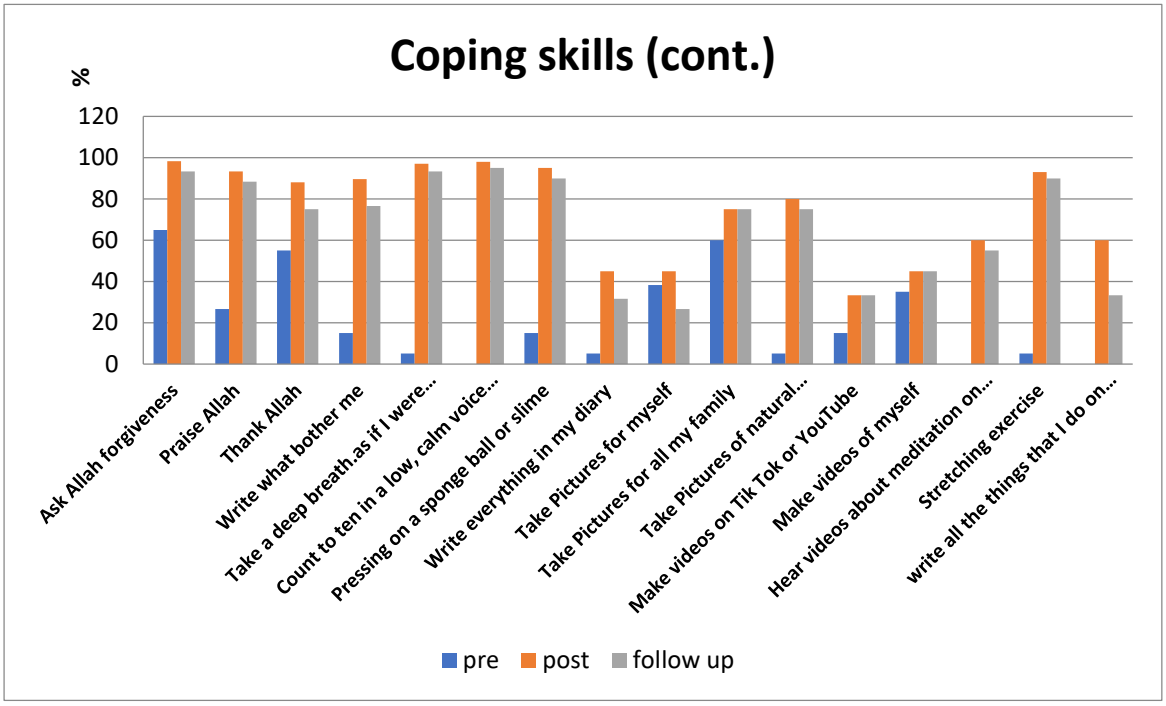


Fig. 3 Distribution of studied children according to coping skills (n=60).

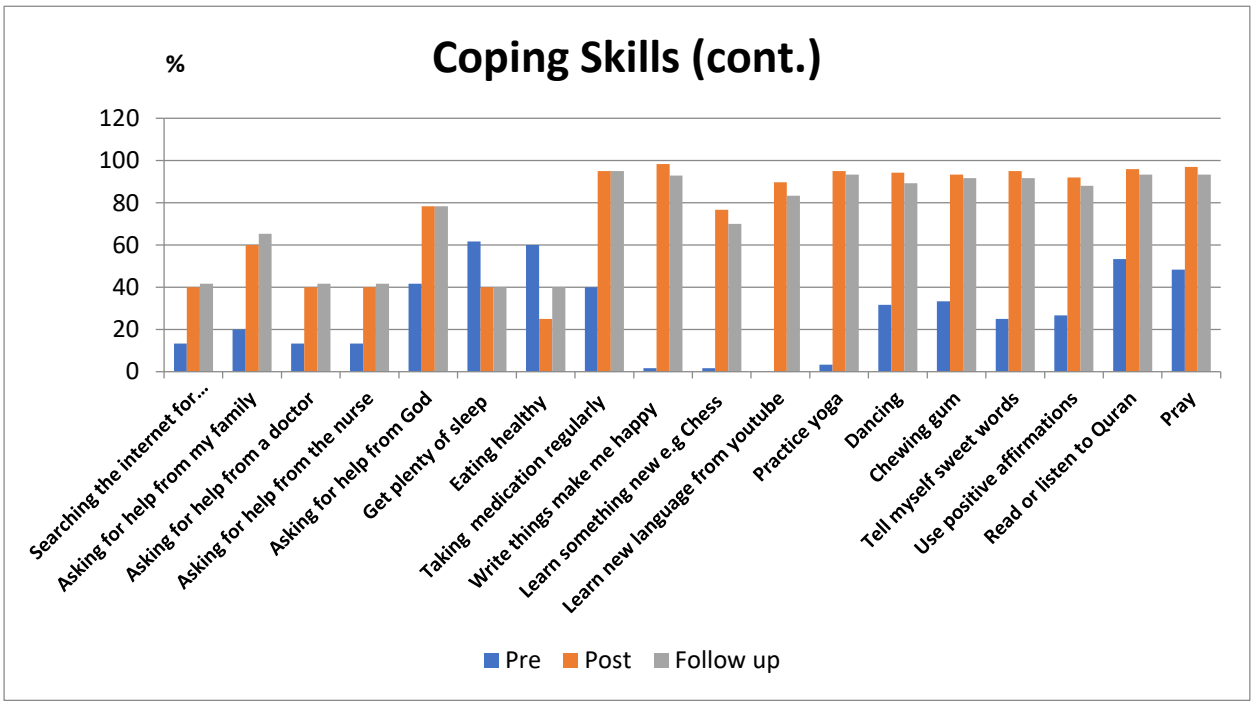


Fig. 4 Distribution of studied children according to coping skills (n=60).

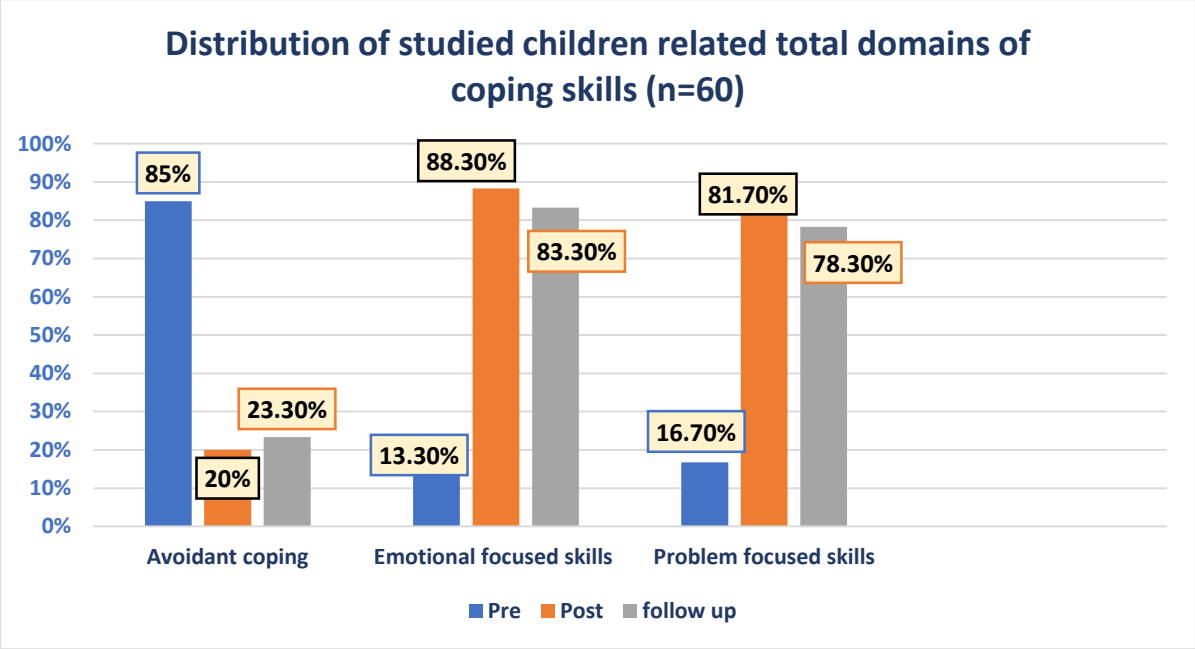


Fig. 5 Distribution of studied children related total domains of coping skills (n=60).

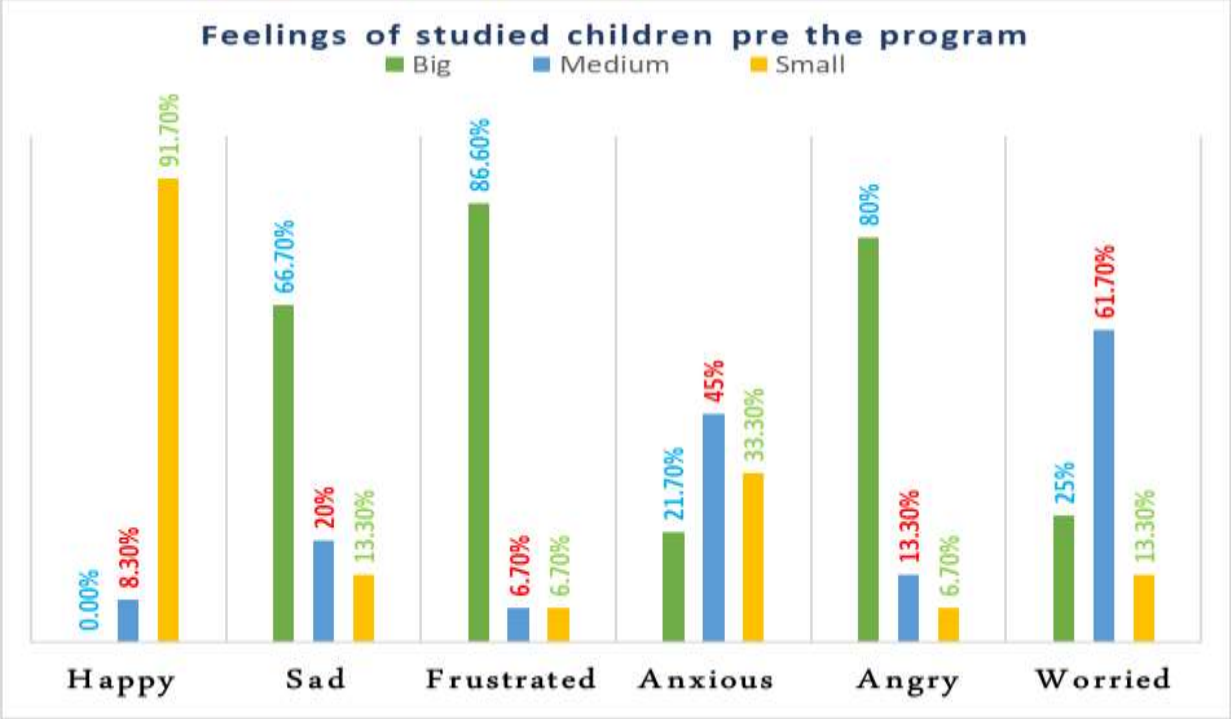


Fig. 6 Feelings of studied children pre the program as reported by their caregivers

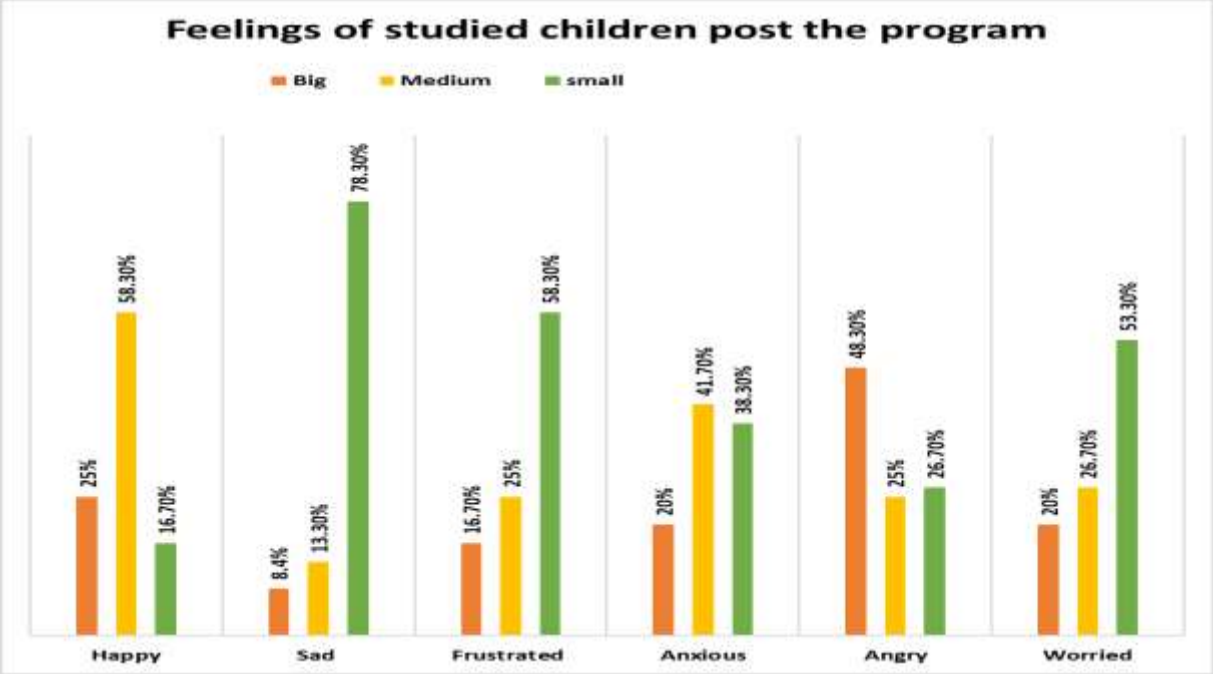


Fig. 7 Feelings of studied children post the program as reported by their caregivers

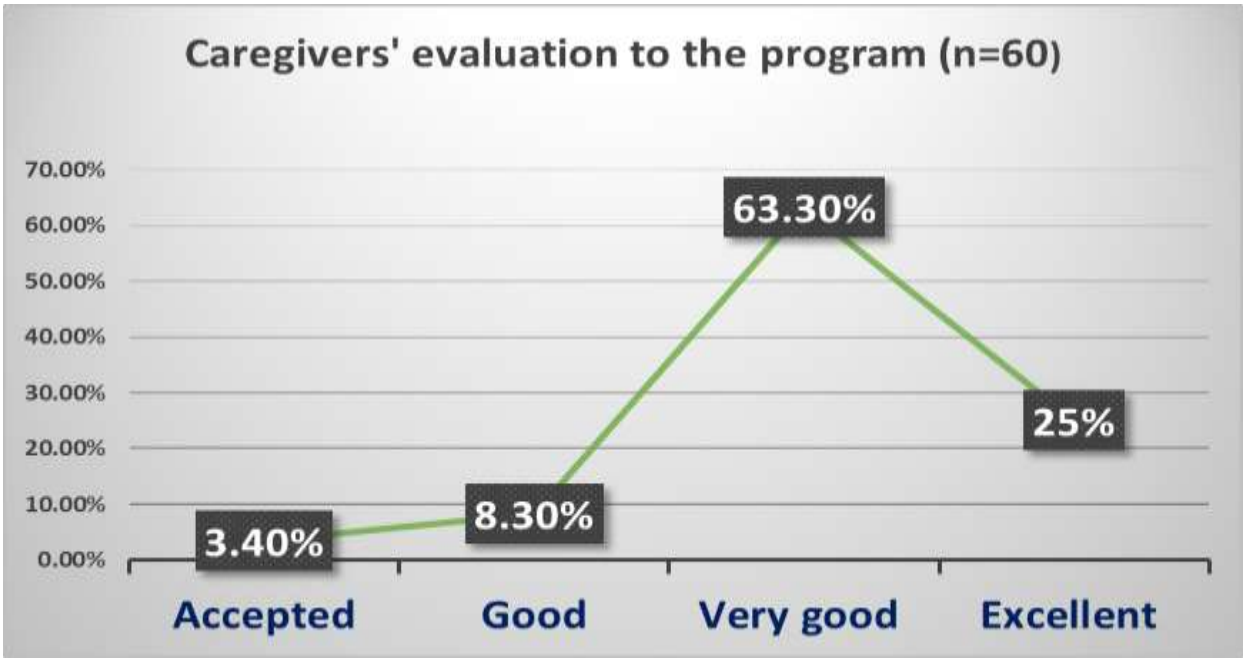


Fig. 8 Distribution of caregivers according to their evaluation to the program (n=60)

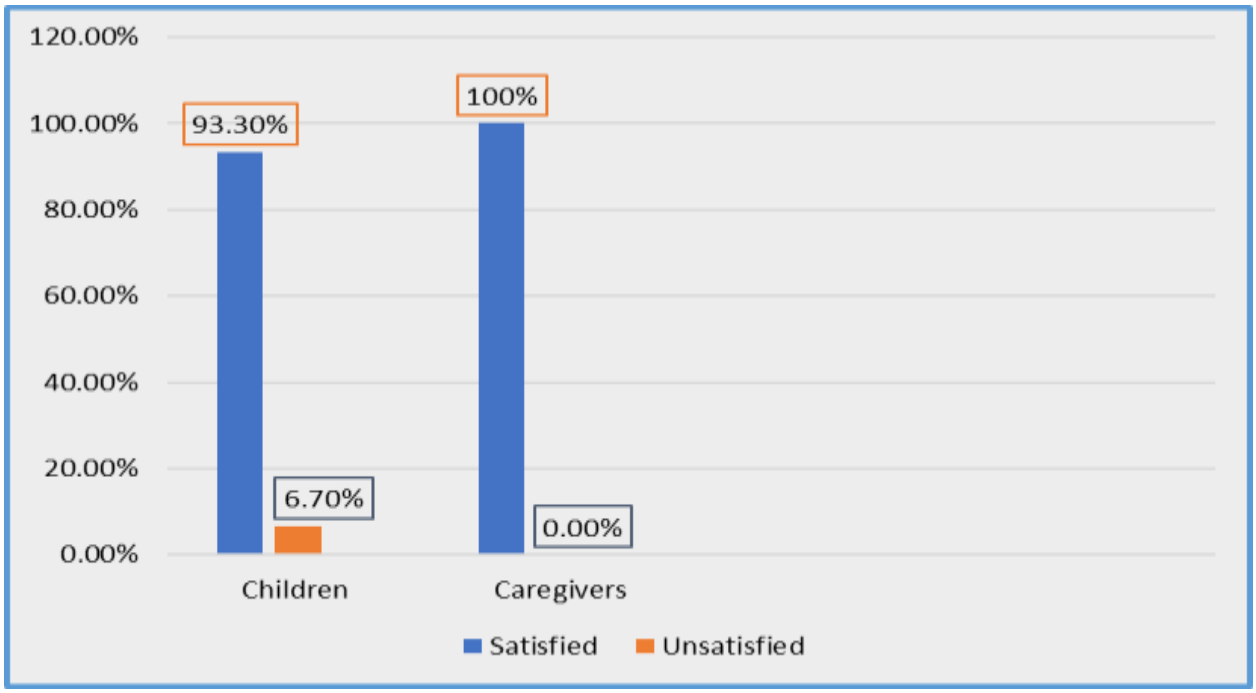


Fig. 9 Satisfaction of children and their caregivers with the program

Table 5 Correlation between mental health pain and coping skills post intervention and follow-up (n=60)

Coping skills	Mental health pain post intervention		Mental health pain at follow up	
	r.	p. value	r.	p. value
Avoidant Coping	0.453	0.001**	0.427	0.002**
Problem focused	-0.610	0.000**	-0.504	0.000**
Emotional focused	-0.496	0.000**	-0.472	0.000**

high significant <0.01

Discussion:

Patients on hemodialysis frequently experience anxiety and depression. Hemodialysis patients appear to be susceptible to anxiety and depression due to a number of factors, including co-morbidities, recurrent hospital stays, chronic pain, uremic symptoms, sleep disturbances, long-term inflammation, and increased exhaustion, a lack of family support in day-to-day living, non-compliance with treatment regimens, which include dietary and fluid restrictions, and dependence on medical professionals for care [22]. Anxiety and depression may be lessened by non-pharmacological treatments for hemodialysis patients, such as psychosocial therapies, cognitive-behavioral therapy techniques, physical activity, and sensory training that modify behavior, emotions, or feelings [23]. In order for patients receiving maintenance hemodialysis to overcome emotional discomfort, psychological resilience is essential [24].

Sociodemographic data

The present study showed that over than fifty percent were boys, while girls constituted lower than half. This is in agreement with Elzakzouk et al. [25] they found males have a higher incidence and prevalence than females. Regarding school attainment, this study revealed that more than one third of children missed their school because of their disease and hemodialysis. The other two thirds of children reported frequent school absenteeism as they were not committed to school because of frequent hemodialysis. Hemodialysis is more physiological and interferes more with a child's education. To make sure these kids have the best chance of succeeding in school, every effort should be taken. Children who miss school frequently and have lower educational achievement may be more vulnerable to psychosocial problems and social isolation, which increases their risk of mental pain as well as health literacy.

Our study showed that, slightly lower than half of children undergoing hemodialysis between less than 5 years, and more than one third undergoing hemodialysis between 5 to 9 years, while less than one quarter undergoing hemodialysis for more than 9 years. Moreover, all the studied children and their families were from rural areas. This may be an alarm sign that children in Egypt's rural areas are at danger for renal failure due to certain risk factors such as inadequate sanitary facilities and limited access to clean water, which have led to chronic kidney illnesses and renal failure. The 2014 Egypt Demographic and Health Survey corroborated this finding that 8.4 million Egyptians, primarily in rural regions, lack access to better sanitation. Furthermore, 10% of Egyptians did not benefit from access to better sanitation in 2014, with notable regional and socioeconomic differences. In 2014, the percentage of people living in rural areas without access to proper sanitation was approximately 15% on average, whereas the percentage among urban residents was approximately 1% [26].

Mental pain

Mental pain was defined by Orbach et al [27] as a variety of subjective experiences that can be described as intensely negative emotions associated with a sense of negative changes in the self and its function. An intensely unpleasant sensation that might be seen as torture is known as "unbearable" mental (psychological) pain. It may be linked to a serious emotional trauma or a mental illness. Many metaphors for psychological suffering are derived from metaphors for physical pain (e.g. heartache, broken heart). According to Bayan et al. [28], hemodialysis patients experience a reduction in their social functioning and a shift in lifestyle that leads to a progressive increase in mental health problems. According to our findings, over than one quarter of the studied hemodialysis children suffered from severe mental pain, while half of them suffered from moderate mental pain as they reported that and rate themselves on the simple mental pain scale before the program. After the program, the percentage has decreased with high statistical significance. This may be due to that, the studied children were guided and trained to practice positive coping skills which improve their mental pain. In follow up these percentages slightly decreased. This may reflect that, there is a need for continuous psychological support at all times. There was a highly statistically significant before and after applying our practical guidance intervention program.

Regarding total domains of coping skills, the majority of the studied children practiced avoiding coping before the program while less than one quarter practiced problem-focused skills, and the lowest practiced coping was emotional-focused coping. After implementation the practical guidance program, emotional- focused coping was the highest practiced by the studied children, followed by problem-focused, and the lowest practiced was

the avoiding coping with highly statistical significance. In agreement, results of the present study are corroborated by Menati et al. [29], which revealed that avoidance coping strategies were the most commonly employed coping strategies. Conversely, Abo El-Ata et al. [30] mentioned that Hemodialysis patients predominantly adapted to stressors associated with chronic hemodialysis treatment by employing affective-oriented coping strategies rather than problem-focused ones. Similarly, with Abbasi et al. [31] and Rahnama et al. [32] who reported that most participants relied on emotion-based coping strategies.

One explanation for this could be that when individuals felt that they had some influence over health-related circumstances, they tended to utilize more emotional focus than problem-focus coping strategies. Therefore, the medical staff, in particular the nurses, should motivate dialysis clients to take charge of as many aspects of the disease and treatment plan as they can. This will encourage more use of problem-focused coping strategies, which can help patients better adapt to the stresses of their illness. The current study illustrated the correlation between mental health pain and coping skills that practiced by the studied children post intervention and follow-up. There was a positive correlation between pain of mental health and practicing avoiding coping skills post intervention and at follow up phase which mean that the increase the mental health pain the increase the practicing of avoiding coping. Also, it was found there was a negative correlation between mental health pain and practiced problem-focused and emotional-focused coping skills at post intervention and follow up phase (which mean when the studied children practice problem focused and emotional focused coping skills this decrease occurrence of mental health pain) with high statistically significant difference ($P< 0.001$).

Coping skills and behaviors

The results of this study showed that most of the children spent most of their times on their phones as coping behavior to escape from their emotional and mental pain. They may try to avoid or reduce their feelings of anxiety and stress through self-distraction. This is supported by Ayoub et al. [33] who pointed out that the prevalence of digital addiction among hemodialysis children had a significantly greater when compared with healthy participants proving significant variations. Furthermore, the same study discovered a significant inverse relationship between the emotional psychological adaptation subtype and digital addiction. According to the current study, feelings of happiness among the studied children were increased while feelings of sadness, anxiety, angry, frustration and worry were decreased after the program as described by their caregivers. This may reflect the need of hemodialysis children for such programs that guide them to practice positive coping skills to reduce their mental and emotional pain. A study by Zhang et al. [23] emphasized that, Psychoeducational interventions have demonstrated significant potential in lowering anxiety and depression and additionally improving quality of life in hemodialysis patients.

Meditation and Mindfulness

Meditation encompasses a variety of techniques designed to harmonize the mind and body, calm mental activity, and enhance overall well-being. Some forms involve focusing attention on a specific sensation, such as breathing, a sound, an image, or a mantra—a word or phrase repeated consistently. Another common type is mindfulness meditation, which involves maintaining focused awareness on the present moment without judgment [34]. According our results, the studied children had not practiced meditation or mindfulness at all pre the program, while the majority of them reported that they meditated and practiced mindfulness after the program. The studied children may not have practiced meditation and mindfulness properly, but they were very

impressed with this coping skill to overcome their anxiety and stress. More practice guidance program regarding meditation and mindfulness are needed for hemodialysis children. In the same line, Garel et al. [35] stated that hemodialysis patients' psychological symptoms and pain can be effectively managed using a mindfulness-based stress reduction strategy. In addition, Al-Ghabeesh et al. [36] recognized that the psychological wellbeing of clients undergoing hemodialysis could be improved by mindfulness. Furthermore, Akbulut and Erci [37] highlighted in their study that implementing conscious mindfulness-based informative approaches significantly improved levels of mindfulness and symptom management in hemodialysis patients. These interventions were also effective in reducing perceived stress and anxiety, emphasizing their potential as valuable tools for enhancing patient well-being.

Stretching exercises

The present finding revealed that only 5% of the studied children practice muscle stretching before the program, while after the program the majority of studied children were impressed to practice stretching exercises. In the same context, a study by Khalf-Allah et al. [38] suggested that muscle stretching and isometric exercises should be a routine component of clinical management for juvenile hemodialysis patients in order to improve everyday living activities and health-related quality of life. Therefore, parents must receive health education regarding the value of muscle stretching as well as instructions on how to perform it at home with their children.

Music

During the present study, the studied children reported that they listen to high, loud and not quite music as only 5% listen to quiet music before the program, while after the program more than three quarters were accustomed to listen quiet music. In the same line, a study conducted in 2024 by Bro et al. [42] live music can be provided in a hemodialysis environment and has a notable impact on patients' feelings of acute anxiety and fatigue. Additionally, the same study found that nurses felt peaceful after a demanding day whereas hemodialysis patients had an uplifting experience that brought them joy and relaxation.

Religion

Concerning religiosity and spirituality, most of studied children practiced religion coping behaviors appropriate to their age. Perhaps this is the result of their certainty of death. They are not resentful of their illness despite the physical and psychological pain. They trust in God despite all feelings and have strong faith despite the weakness of their bodies. According to Silva et al. [43] believed that spirituality and religion are significant factors in assisting patients in managing their illness. Hassani et al. [44] found that spiritual practices can enhance mental health and well-being. Engaging in spiritual activities may provide individuals with a sense of purpose, community support, and coping mechanisms, all of which contribute to improved mental health outcomes. These findings underscore the importance of considering spiritual practices as a complementary approach in mental health care. In agreement with the previous studies, Al Zaben et al. [45] who looked into the association between religious practices and the health status of patients receiving hemodialysis, reported that religious practices and internal religious beliefs showed better overall psychological performance. A 2019 study by Gencer [46] found a strong correlation between the wellbeing of hemodialysis patients and their religiosity. In agreement, Santos et al. [47] noted that coping with the illness helps lessen anxiety because it provides a sense of relief that comes from believing that God, a higher power, is in overall control of the situation and intervenes throughout illness.

Because it provides comfort, it can also be utilized to lessen the symptoms of pain experienced by these people. In hemodialysis patients, religious and spiritual coping is also linked to a higher quality of life and less depression. The impact of spirituality and beliefs offers satisfaction when adjusting to the disease's everyday alterations. Greater inner strength is one of the benefits of spirituality.

According to the present study, it was found that more than half of caregivers evaluated the program as very good, while one quarter evaluated it as an excellent program. Less than one tenth evaluated the program as good and 3.40% reported that the program was accepted. Despite of that, 93.30% of the studied children and 100% of their caregivers reported their satisfaction with the program. This may reflect that psychological and mental pain of children burden and affect their caregivers. Therefore, practical guidance for positive coping skills help children to cope and satisfy their caregivers. In the same line Zhang et al., [48] emphasized on the idea that caregiver burden is directly impacted by the coping methods of patients. The impact of patient coping strategies on caregiver burden is influenced by family resilience in an indirect manner. Additionally, it was discovered that family resilience had a good impact on caregiver stress and that the patients' negative coping had a negative impact. Medical practitioners should evaluate their patients' coping mechanisms and put measures in place to lessen the stress that comes with their poor coping strategies. To lessen the stress on caregivers brought on by patients' unhealthy coping mechanisms, the beneficial effects of family resilience should be completely utilized to control the patient-caregiver dynamic.

Feelings of children as reported by parents

Happiness

According to the present study, it was found that there were not any children felt happy to big degree as reported by their caregivers before the program, while after the program according to the caregivers one quarter of the children felt happy to big degree and more than half felt happy to medium degree with high statistical significance pre-post and follow up. This may suggest that in order to ensure their happiness, children receiving hemodialysis require well-structured programs that address the physical and psychological elements with intelligent manipulation and more care. Frad Tabatabaei et al. [39] assert that a key component of mental health is happiness. Additionally, Mehrdadi et al. [40] pointed out that happiness provides a number of benefits, including a positive outlook on life, a stronger sense of self, more energy, better mental health, and enhanced social and physical performance. Happiness is also essential for efficiently overcoming daily problems. Ultimately, improved mental and physical wellness results are positively correlated with patients' improved happiness during hemodialysis [41]. Furthermore, the current study found that over half of the children under investigation experienced significant levels of sadness. while the majority felt frustrated to a big degree, more than three quarters felt angry to a big degree and more than half felt worry to a big degree as reported by their caregivers before implementation of the program. After the program there was statistical significance that showed relatively improvement in feelings of the studied children pre-post and follow up.

Conclusion

The outcomes of the present research indicated that the differences were statistically significant among children before and after the application of program. According to the results of this study, the positive coping skills practical guidance program has a positive effect on hemodialysis children as the training program shifted the children from avoidant coping to approach coping and decreased their mental pain. In addition to the high

satisfaction level of caregivers as well as their children with the program.

Recommendation

1) Ongoing educational training courses for nurses and caregivers to support children in establishing healthy coping mechanisms and getting rid of harmful coping mechanisms.
2) Children receiving hemodialysis require more practice assistance in mindfulness and meditation.
3) Well-structured programs that address all the psychological and physical components with smart management and increased focus are necessary for the happiness of children receiving hemodialysis.
4) Future studies on teaching children and adolescent's methods of coping against stressors or events they might encounter in the future

Declarations

Ethics approval and consent to participate

Formal approval for the study was obtained from the Dean of the Faculty of Nursing and the Director of Zagazig University Hospital, Egypt. Oral consent was secured from children undergoing hemodialysis and their caregivers before participation. During the initial interview, the study's purpose and procedures were clearly explained, and participants provided oral consent. Participants were assured of confidentiality, with all information handled securely to protect their privacy. It was emphasized that participation was entirely voluntary, and individuals could withdraw or decline to participate at any time without consequences. Additionally, it was clarified that there were no associated costs for participating in the study. Approval was also secured from the Ethics Committee of the Faculty of Nursing at Zagazig University, Egypt (REC 0014:6-3-2023). The study questionnaire was administered directly by the researchers. Both the children and their caregivers were informed about the study's purpose and encouraged to share their feelings openly.

Clinical trial number: not applicable.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

All authors of this research contributed to the conception of the study; N.M. contributed to the study design, material preparation, data collection and writing manuscript. F.N. contributed to the study design, material preparation, data analysis and writing manuscript. R.A. contributed to the study design, material preparation, data collection and reviewing manuscript. All authors contributed to and approved the final manuscript.

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