

ISSN 2320-8643 (Print) ● ISSN-2320-8651 (Electronic)

Volume 06 / Number 01 / January-June 2018



INTERNATIONAL JOURNAL OF NURSING CARE



Website: www.ijonc.com

Promoting Healthy Lifestyle for Survivor Adolescents with Leukemia and their Caregivers

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ABSTRACT

Background: There has been a dramatic increase in the number of childhood cancer survivors living to an old age due to improved cancer treatments so promote a healthy lifestyle for them very important. **The aim:** Evaluate the effect of promoting healthy lifestyle program to survivor adolescents with leukemia and their caregivers. **Design:** A quasi-experimental research design. **Setting:** Pediatric Outpatient Clinic and waiting room affiliated with Specialized Pediatric Hospital at Benha City. **Sample:** A purposive sample of thirty eight survivors' adolescents with leukemia and their caregivers. **Tools:** I-Structured interviewing questionnaire. II- The health-promoting lifestyle profile and III- Caregiver burden scale. **Results:** less than two-third of the adolescent were male live in the urban area; more than two third of them was a survivor from ALL. There were improving adolescent and their caregiver knowledge post-intervention. There was statistically significant between caregiver's burden and their promoting the healthy lifestyle. Also, reflect that mild burden of caregivers associated with achieving promoting healthy lifestyle for their adolescent. **Conclusion:** The promoting healthy lifestyle program was effective to improve healthy promoting lifestyle for survivor adolescent with leukemia and their caregivers. **Recommendation:** Continue follow-up guidelines for particular groups of survivors' adolescents and their caregivers to discover any changes in health status and maintain healthy behavior lifestyle.

Keywords: Caregivers — Survivor adolescent with leukemia —Health-Promoting Lifestyle

INTRODUCTION

The pediatric cancer consider survived by least five years from the last evidence of disease and is at least two years from the discontinuation of therapy since believe that children with cancer are likely to be cured are the most relevant subjects for the study of late effects ^[26].

Leukemia is the most common malignant neoplasm in childhood, accounting for about 35% of all malignancies that occur in children <15years of age. Acute Lymphoblastic Leukemia (ALL) and Acute Myelogenous Leukemia (AML) account for about 77% and 11% of cases of childhood leukemia respectively. Leukemia is a group of cancers that develop in the bone marrow ^[13].

Today, a curative approach is used encompassing a variety of treatment protocols. The current overall event-free survival rates of approximately 80% for ALL. Also, survival rates of approximately 50% for AML have been

due to the development of active chemotherapeutic agents and significant advances in supportive care ^[25].

Childhood cancer account for approximately 14% of all deaths worldwide, estimated 12.66 million new cancer cases and 7.56 million deaths occurred in 2011 worldwide. It is the leading cause of death in the developed world and the second leading cause of death in the developing world ^[29; 6].

Adolescence with survivor leukemia should aim to encourage the adoption of health-promoting behaviors and strongly counsel avoidance of health-damaging behaviors. Adolescence is a developmental period with especially crucial and normative experimentation with health-damaging behaviors and potential future dependence, pose a threat to the overall health and well-being for childhood leukemia survivors. A leukemia diagnosis may also present an opportunity for a “teachable moment” to convey health promotion

information and health risks with significant impact. However, these survivors are at risk of numerous late effects as a result of their leukemia therapy. Engaging in protective health behaviors and limiting health-damaging behaviors are vitally important for these survivors given their increased risks [7].

Caregiver of survivor adolescent with leukemia needed guidance on a range of issues including the illness process, diagnosis, treatment, home care, side effects of treatments to be aware of, managing potential infections, and nutrition. It would be interesting to identify whether caregiver feels that emotional support and coping strategies should be a part of education provided by nurses. Thus, it is necessary to investigate the families for educated and supported to provide nursing care for the child at home. It is necessary that families receive adequate information and advice prior to discharge for recognizing and acting on simple signs such as a fever, which can mean life or death for a child with acute lymphoblastic leukemia due to neutropenia as a result of treatment or disease process [2,33].

Caregiver burden is a term used to describe the weight or load carried by caregivers as a result of adopting the caregiver role. Research supported the link between caregiver burden and achievement of healthy lifestyle behaviors of children with survivor leukemia. Achievement of evidence-based lifestyle practices (i.e., diet and physical activity) is a key step in primary prevention in these children. Evaluation of the association between caregiver burden and achievement of healthy lifestyle among children is important because a link would implicate caregiver burden as a potential mediator of these children risk [10]. Caregivers of children with survivor cancer were face many challenges, as varying degrees of physical and psychological disruptions, isolation, restrictions in routine daily activities, and their events. Research indicates that higher levels of caregiver's cohesion and adaptability, lower levels of caregiver's disruption, increased through support resources and communication also, reinforce the significance of promoting healthy lifestyle during caring their children with life-threatening or chronic illness [33].

Nurses need to help caregivers develop problem-solving, organizational, communication skills, and judgment to carry out the tasks of care for children, and research shown that caregivers has feel prepared to deliver care (i.e., have the knowledge and health

promotion needed) have less burden. Nurses play an important role in facilitating survivor adolescent' ability to recognize and achieve a balance in life. Support the survivor adolescent in this endeavor the nurse should identify what is valuable to them in the short-term while assisting them in developing long-term goals. Empowering the survivor adolescent with knowledge and delivering nurse-specific interventions involves collaboration and introspection. So that, the nurse can help their adolescent by endorsing the health guidelines and encouraging them to take active roles in pursuing health life style behaviors [9].

SIGNIFICANT OF THE STUDY

Leukemia is the most common malignancy in children. Accounting for almost one third a newly diagnosed pediatric cancer case. The annual incidence is approximately four case per 100, 00 children per year in National Cancer Institute, Cairo University, Egypt. All constitute 30% of all pediatric malignancies. Related to current evidence, between 30% and 50% of cancer mortality could be prevented through modifying or preventing risk factors, for example as maintaining a healthy body weight, exercising regularly and addressing infection-related risk factors [6,28].

Caregivers play an important role in delivering complex health care services in and out of the hospital. Survivors adolescent with leukemia face an increased risk of morbidity and mortality. Health promotion for survivor adolescent with leukemia can be a very challenging experience for the caregivers with lack clinical knowledge. So that, caregivers concerning are in desperate need of knowledge and support from healthcare professionals [32, 19 : 1].

The aim of the study: The study aimed to evaluate the effect of promoting healthy lifestyle program to survivor adolescents with leukemia and their caregivers through:

- Assessing knowledge of adolescents with survivor leukemia and their caregivers regarding promoting healthy lifestyle.

- Assessing caregiver's burden related care of survivor adolescents.

- Designing and implementing promoting healthy Lifestyle program according to adolescents and their caregivers' needs.

-Evaluating the effectiveness of the program.

Research hypothesis: Survivor adolescents with leukemia and their caregivers who received promoting healthy lifestyle program would have a better healthy lifestyle.

SUBJECT AND METHOD

Operational definition: A healthy lifestyle helps people to keep and improve the health and well-being. The most of governments and non-governmental institutions act for promoting healthy lifestyles which include healthy eating, physical activities, weight management, and stress management [30].

Research design: A quasi-experimental research design was used in the study.

Setting: The study was conducted at Pediatric Outpatient Clinic and waiting room affiliated with Specialized Pediatric Hospital in Benha City.

Subjects of the study: A purposive sample of thirty eight survivors' adolescents with leukemia and their caregivers who attended the previously mentioned setting and seeking for follow up and treatment was recruited in the study. The studied survivor's adolescents were chosen according to **inclusion criteria**; Survivor adolescents with leukemia aged 10-18 years; both sex (males and females) and free from others neurological disorder, chronic physical disease or handicapped (through checking the child chart). **Inclusion criteria for the caregivers:** Caregivers that give direct care to the adolescents; are willing to participate in the study; and exclusion of caregivers with psychiatric problems.

Tools of data collection:

First tool: A structured interviewing questionnaire was designed by the researchers in the Arabic language in the form of close and open-ended questions after reviewing of related literature, which comprised of four main parts:

Part I: General characteristics of the studied survivor adolescents with leukemia as age, sex, educational level, and order.

Part II: Caregivers characteristics as age, sex, educational level, marital status, occupation, relative degree, residence.

Part III: History of leukemia as the onset of disease, duration of survivor/years; family history of cancer, types of treatment was taken.

Part IV: Adolescent and their caregivers' knowledge about recurrence the secondary tumor it was composed of 5 items as signs and symptoms of the secondary tumor, long term effect of leukemia and treatment, follow up system, palliative and supportive care, and improve self-esteem and body image.

Scoring system: Each complete right answer was given 2 score, in complete answer was given 1 score wrong answer was given zero. The total scores of items were 10 degree those who obtained <60% were considered having the unsatisfactory level of knowledge. While those who obtained > 60 was considered having satisfactory.

Second tool: The Health-Promoting Lifestyle Profile to assess lifestyle of survivor's adolescents and their caregivers adopted from [24] pre/post questionnaire is a self-report of health-promoting lifestyle habits; subscales include, health responsibility, physical activity, nutrition, spiritual growth, interpersonal relation, and stress management.

Scoring system: The score for overall health-promoting lifestyle calculate the frequency of all 52 questions; to calculate the score for each of the six subscales, calculate the mean of the responses to subscale items, Scoring: Never (N) = 1 Sometimes (S) = 2 Often (O) = 3 Routinely (R) = 4 .

Subscales: Health-Promoting Lifestyle Q 1 to 52. First: Health responsibility Q 3, 9, 15, 21, 27, 33, 39, 45, 51. Second: Physical activity Q 4, 10, 16, 22, 28, 34, 40, 46. Third: Nutrition Q 2, 8, 14, 20, 26, 32, 38, 44, 50. Fourth: Spiritual growth Q 6, 12, 18, 24, 30, 36, 42, 48, 52. Fifth: Interpersonal relations Q 1, 7, 13, 19, 25, 31, 37, 43, 49 . Final: Stress management Q 5, 11, 17, 23, 29, 35, 41, 47.

Third tool: Caregivers burden scale adopted from [34]: This self-administered short version 10-item questionnaire assesses the "experience of burden." The questions reflect caregiver feel during taking care of survivors adolescent with leukemia. After each question, circle about feeling that way: never, sometimes, and always. There are no rights or wrong answers.

Scoring system: The response of participant from 0 to 5 = little or no burden; 6 to 10 = mild burden; 11 to 20 = moderate burden; 21 to 30 = severe burden.

Tools validity and reliability:

Tools were reviewed by a panel of three experts in the field of pediatric nursing and community health nursing to test content validity. Reliability was done by Alpha reliability coefficient = 0.922. Alpha coefficients for subscales = 0.702 - 0.904.

Ethical considerations:

All survivors adolescent and their caregiver were informed about the purpose and benefits of the study at the beginning of the study. An oral consent was obtained from each of them before starting the data collection. All data were coding and assured that all information was used for only research purpose; participation is freedom to withdraw from the study at any time.

Pilot study:

The pilot study was carried out on four survivor adolescent with leukemia and their caregiver (about 10% of the total sample) to test the tool for clarity and applicability, as well as estimation of the time needed to fill the questionnaire. No required modifications were done. Survivor adolescent with leukemia and their caregiver involved in the pilot were included in the study.

Procedure:

To fulfill the aim of the current study, the following phases were adopted; assessment phase, planning phase, implementation phase, and evaluation phase. These phases were carried out from the beginning of October 2015 and completed at the end of April 2016 covering seven months. Official approvals and letters to conduct this study were obtained from the Dean of Faculty of Nursing to Director of Specialized Pediatric Hospital in Benha City. The researchers visited the previously mentioned setting two days/week (Saturday and Monday) from 9.00 Am to 1.00 Pm.

Assessment phase: This phase encompassed interviewing the survivor adolescents and their caregivers to collect baseline data, at the beginning of the interview the researchers greeted them, explained all information about the study purpose, duration, and activities and taken oral consent. Data were collected by

the researchers through the administration of the tools to each of them and explaining the questionnaires to them.

Planning phase: Based on the needs identified in the assessment phase and relevant review of the literature, the researchers developed a booklet about health-promoting lifestyle regarding survivors' leukemia. This was prepared in simple Arabic language and distributed to all subjects in the study to achieve its objectives. Session one identify the survivor adolescent signs and symptoms of the secondary tumor, follow up the system, palliative and supportive care, improve self-esteem and body image. Session two the survivor adolescent recognize the health-promoting lifestyle profile. Session three assess caregiver burden of survivors adolescent with leukemia. At the end of each session, the survivors' adolescents with leukemia and their caregivers were informed about the content of the next session and its time

Implementation phase:

The promoting lifestyle program was implemented through seven months, by three sessions in the waiting area of the Outpatient Clinic; The duration of each session ranged between 20-30 minutes. The health-promoting program was implemented either individually or in groups from 2 to 4 survivor's adolescents and their caregivers. At the beginning of each session, the researchers started with a summary about what was given through the previous session, aims and objectives of the current session, taking into consideration using simple and clear language to suite survivors' as well as the caregivers' educational level. Different methods of teaching were used including small group discussion, brainstorming, and demonstration. The teaching aids used were brochures, colored posters, real model and laptop screen show. At the end of each session, the survivors' adolescents and their caregivers were informed about the content of the next session and its time.

Evaluation phase:

Evaluation of health-promoting program was done immediately after implementation of the program by using post test similar to the pre-format questionnaire sheet.

Statistical analysis:

Data were verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS)

version 20.0 was used for that analysis and tabulation of data. Descriptive statistics were applied (mean, standard deviation, frequency, and percentages). Tests of significance were performed to test the study hypotheses. Pearson correlation coefficient was applied for quantitative variables. A statistically significant difference was considered at $p \leq 0.05$, and a highly statistically significant difference was considered at $p \leq 0.001$.

RESULTS

Table 1: Revealed that 52.6% of adolescent aged from 10-15 years; with mean age $X \pm SD$ 12.06 ± 2.17 . As regard sex 65.8% of them were male. Regarding education level, 47.4% had the secondary school and 55.3% of them were last order.

Table 2: Illustrated that 47.4% of caregivers' age between 45<55 years, meanwhile 86.4% of them were female. Regarding education level 84.2 % of them had university education and 78.9% of them were married and 76.3% were not working. As regards relative degree 92.1% of them from first degree and 68.4% of them live in urban area.

Table 3: Show that 73.7% of adolescent had the family history of cancer and 92.1% of them had the onset of disease from 3-4 years, 73.7% of them were the survivor from ALL. Meanwhile, 68.4% of adolescent treated by chemotherapy and duration of survivor was 89.5% of the adolescent from 1-2 years.

Table 4: revealed that there was a statistically significant difference between pre and post-program in the knowledge of the study samples regarding signs and symptoms of the secondary tumor, follow up the system, and improve self-esteem and body image at ($P < 0.05$). Meanwhile, there was the highly statistically significant difference between pre and post-program in the knowledge of the study samples regarding long-term effect from leukemia and treatment and palliative and supportive care at ($P < 0.01$).

Figure 1: illustrate that there were improve adolescent and their caregivers knowledge post-program than pre-program which satisfactory knowledge pre-program was 21% and 34.2% respectively, meanwhile post-program satisfactory knowledge becomes improved to 68.4% and 84.2% respectively.

Table 5: show that there were statistical significant differences ($P < 0.05$) between pre/post caregiver burdens related reduced life satisfaction; wish to run away, health affected by the caregiver. Meanwhile, there was highly statistical significant ($P < 0.001$) related to relationships with others are suffering.

Table 6: revealed that there was the highly statistically significant difference between caregiver's pre and post-program related health-promoting lifestyle profile (spiritual growth, physical activity, and nutrition, health responsibility, stress management and interpersonal relation at $P < 0.01$).

Table 7: revealed that there was the highly statistically significant difference between adolescent pre and post-program related health-promoting lifestyle profile (spiritual growth, physical activity, and nutrition, health responsibility, stress management and interpersonal relation at $P < 0.05$).

Figure 2: illustrated that there was statistical significant between caregiver's burden and their promoting healthy lifestyle. Also, reflect that mild burden of caregivers associated with achieving promoting healthy lifestyle for their adolescent.

Table 8: there was statistical significant between age and education level with health responsibility of adolescent at 0.05, Also between education level and physical activity. Meanwhile, there were statistical significant between educational level and nutrition at 0.05, in addition to education level and order of adolescent with spiritual growth at 0.01. Also, there was statistical significant between stress management and all variables at 0.05.

Table (1): Distributions of characteristic of survivor adolescent with leukemia

Variables	No	%
-Age/year		
10-15	20	52.6
15<18 year	18	47.4
X±SD	12.06±2.17	
-Sex		
Male	25	65.8
Female	13	42.2
Educational level		
Primary	8	21
Preparatory	12	31.6
Secondary	18	47.4
-Child order		
First	9	23.7
Middle	8	21
Last	21	55.3

Table 2: Distribution of demographic characteristics of caregivers

Variables	No	%
-Age/year		
<25	2	5.3
25<35	6	15.8
35<45	12	31.6
45<55	18	47.4
X±SD	38.46±7.56	
-Sex		
Male	5	13.6
Female	33	86.4
-Education level		
Read and write	1	2.6
Primary	2	5.3
Secondary	1	2.6
University	32	84.2
Graduates studies	2	5.3
-Marital status		
Married	30	78.9
Widow	5	13.2

Divorced	3	7.8
Occupation		
Working	9	23.7
Not working	29	76.3
Relative degree		
First degree	35	92.1
Second degree	3	7.9
Residence		
Rural	12	31.6
Urban	26	68.4

Table 3: Distribution of leukemia history for survivors' adolescents

Variables	No	%
Family history of cancer		
Yes	28	73.7
No	10	26.3
Onset of disease/years		
1-2	3	7.9
3-4	35	92.1
Types of leukemia survivor		
ALL	28	73.7
AML	10	26.3
Types of treatment		
Chemotherapy	26	68.4
Radiotherapy	10	26.3
Surgery	2	5.3
-Duration of survivor/years		
1-2	34	89.5
3-4	4	10.5

Table 4: Distribution of adolescent and their caregiver's knowledge towards recurrence of secondary tumor pre/post program

Items	Adolescents						Caregivers						X ²	P												
	Pre			Post			Pre			Post																
	Complete	In complete	Wrong	Complete	In complete	Wrong	Complete	In complete	Wrong	Complete	In complete	Wrong														
-Signs and symptoms of secondary tumor	No 3	% 7.9	No 10	% 26.3	No 25	% 65.8	No 33	% 86.8	No 4	% 10.5	No 4	% 10.5	No 2	% 5.3	No 7	% 18.4	No 31	% 81.6	No 26	% 68.4	No 10	% 26.3	No 2	% 5.3	7.12	.005
-Long-term effect of leukemia and treatment	No 5	% 13.2	No 5	% 13.2	No 28	% 73.7	No 20	% 52.6	No 10	% 26.3	No 8	% 21	No 7	% 18.4	No 11	% 28.9	No 20	% 52.3	No 28	% 73.7	No 8	% 21	No 2	% 5.3	11.1	.001
-Follow up system	No 8	% 21	No 9	% 23.7	No 21	% 55.3	No 23	% 60.5	No 7	% 18.4	No 8	% 21	No 4	% 10.5	No 14	% 36.9	No 20	% 52.6	No 26	% 68.4	No 6	% 15.8	No 6	% 15.8	12.7	.005
-Palliative and supportive care	No 4	% 10.5	No 11	% 28.9	No 23	% 60.5	No 30	% 78.9	No 5	% 13.2	No 3	% 7.9	No 8	% 21	No 5	% 13.2	No 25	% 65.8	No 24	% 63.2	No 3	% 7.9	No 1	% 2.6	9.25	.001
-Improve self-esteem and body image	No 1	% 2.6	No 7	% 18.4	No 31	% 81.6	No 30	% 78.9	No 6	% 15.8	No 2	% 5.3	No 7	% 18.4	No 7	% 18.4	No 24	% 63.2	No 29	% 76.3	No 7	% 18.4	No 2	% 5.3	8.25	.005

Table 5: Distribution of caregiver's burden pre/post program

Items	Pre caregivers burden				Post caregivers burden				X ²	P								
	Little or No		mild		moderate		Sever											
	N	%	N	%	N	%	N	%	N	%								
Reduced life satisfaction	1	2.6	6	15.8	15	39.5	16	42.1	11	28.9	24	63.2	3	7.9	0	0	4.01	<0.05
Physical exhaustion	2	5.3	5	13.2	21	55.3	10	26.3	2	5.3	11	28.9	17	44.7	8	21.1	6.12	>0.04
Wish to run away	2	5.3	7	18.4	6	15.8	23	60.5	19	50	8	21.1	9	23.7	2	5.3	7.36	<0.05
Depersonalization	0	0	13	34.2	22	57.9	3	7.9	20	52.6	10	26.3	3	7.9	5	13.2	6.23	>0.03
Decreased standard of living	8	21.1	14	36.8	14	36.8	2	5.3	19	50	8	21.1	6	15.8	5	13.2	8.25	>0.07
Health affected by caregiver	0	0	2	5.3	24	63.2	12	31.6	19	50	11	28.9	3	7.9	3	7.9	7.01	<0.05
Caregiver is taking strength	0	0	23	60.5	7	18.4	8	21.1	18	47.4	9	23.7	2	5.3	9	23.7	5.12	<0.05
Conflicting demands	0	0	0	0	28	73.7	10	26.3	19	50	12	31.6	4	10.5	3	7.9	9.35	>0.02
Worried about the future	0	0	0	0	6	15.8	32	84.2	19	50	9	23.7	10	26.3	0	0	4.09	<0.01
Relationships with others are suffering	0	0	1	2.6	32	84.2	5	13.2	19	50	10	26.3	4	10.5	5	13.2	3.98	<0.01

Figure 1: knowledge of survivor adolescents and their caregiver's related secondary tumor pre/post program

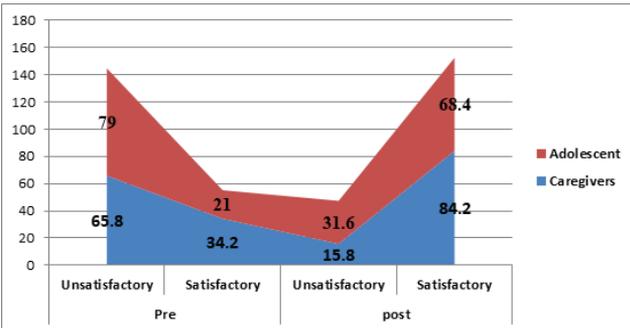


Table 6: Health-Promoting Lifestyle Profile pre/post program of caregivers

Items	Pre health-promoting lifestyle profile						Post health-promoting lifestyle profile						X ²	P				
	Never		Sometimes		Often		Never		Sometimes		Often							
	No	%	No	%	No	%	No	%	No	%	No	%	No	%				
Health responsibility	20	26.3	9	11.8	3	3.9	6	7.9	1	1.3	11	14.5	10	13.2	16	21.1	10.2	<0.01
Physical activity	17	22.4	9	11.8	10	13.2	2	2.6	1	1.3	12	15.8	8	10.5	17	22.4	12.2	<0.01
Nutrition	20	26.3	7	9.2	8	10.5	3	3.9	0	0	10	13.2	12	15.8	16	21.1	11.0	<0.01
Spiritual Growth	22	28.9	10	13.2	4	5.3	2	2.6	0	0	14	18.4	10	13.2	14	18.4	11.3	<0.01
Interpersonal relation	22	28.9	9	11.8	4	5.3	3	3.9	0	0	10	13.2	6	7.9	22	28.9	10.7	<0.01
Stress management	19	25	7	9.2	8	10.5	4	5.3	0	0	12	15.8	11	14.5	15	19.7	11.0	<0.01

Table 7: Health-Promoting Lifestyle Profile pre/post program of survivor adolescents with leukemia

Items	Pre health-Promoting lifestyle profile								Post health-Promoting lifestyle profile								X ²	P
	Never		Sometimes		Often		Routinely		Never		Sometimes		Often		Routinely			
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%		
Health responsibility	23	30.3	5	6.6	3	3.9	7	9.2	2	2.6	10	13.2	10	13.2	16	21.1	3.30	<0.05
Physical activity	19	25	7	9.2	5	6.6	7	9.2	6	7.9	9	11.8	4	5.3	19	25	4.96	<0.05
Nutrition	22	28.9	6	7.9	7	9.2	3	3.9	1	1.3	9	11.8	9	11.8	19	25	6.25	<0.05
Spiritual Growth	24	31.6	10	13.2	1	1.3	3	3.9	1	1.3	14	18.4	8	10.5	15	19.7	6.69	<0.05
Interpersonal relation	24	31.6	6	7.9	2	2.6	6	7.9	1	1.3	8	10.5	3	3.9	26	34.2	7.41	<0.05
Stress management	21	27.6	4	5.3	8	10.5	5	6.6	1	1.3	9	11.8	11	14.5	17	22.4	5.84	<0.05

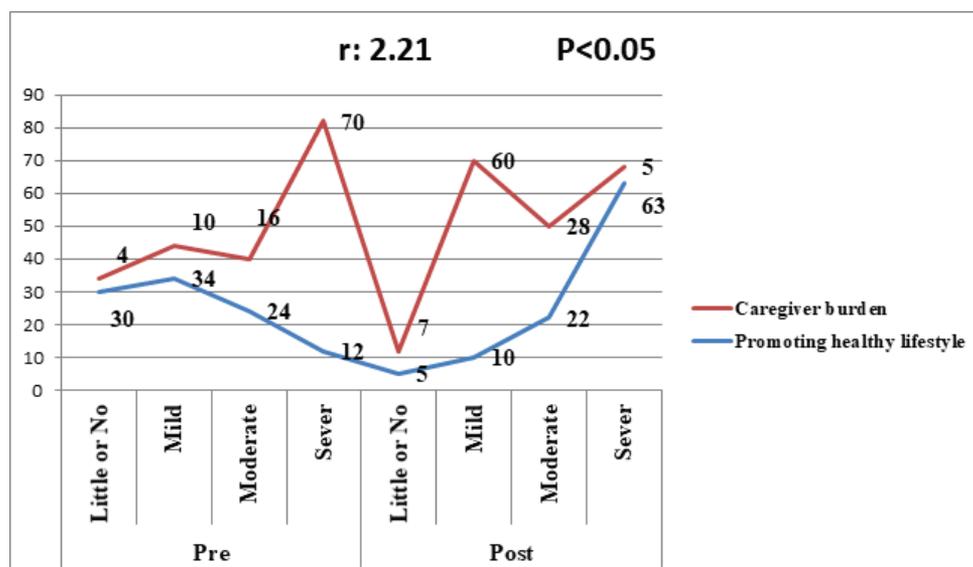


Figure 2: Correlation between caregiver's burden and their promoting healthy life style pre/post program

Table (8): Correlation between survivor adolescent promoting healthy lifestyle and their socio-demographic characteristic

Variable	Health responsibility		Physical activity		Nutrition		Spiritual growth		Stress management	
	r	p	r	p	r	p	r	p	r	p
Age	1.24	0.05	4.58	0.02	5.02	0.03	5.36	0.02	1.08	0.05
Sex	3.25	0.02	3.12	0.03	3.02	0.04	4.32	0.03	1.06	0.05
Education level	2.01	0.05	2.08	0.05	1.06	0.05	2.04	0.01	2.04	0.05
Order	4.57	0.03	2.36	0.02	3.45	0.03	1.08	0.01	1.09	0.05

DISCUSSION

The healthy promoting lifestyle was needed for adolescent survivors to enhance the wellbeing and quality of their life. Engaging in a healthy lifestyle, by avoiding risk factor is particularly crucial for these adolescents with leukemia survivors^[5].

The present study revealed socio demographic characteristics of survivors' adolescents with leukemia (**Table 1**) more than half of them were at age 15-10 years. As regard sex more than half of them were male. Regarding education level less than half of them were in secondary education; more than half of them were last order. This result agrees with the study done by^[4] who found that most age of children was 12 years with male gender, the majority of children located in the upper secondary school and have one sibling only.

As regard, socio-demographic characteristics of the caregiver (**Table 2**) illustrated that more than one-third of caregivers aged between 45<55 years, meanwhile more than two third of them were female. Regarding education level, more than two third of them had the university education and more than three-quarters of them were married and not working. Also less than two third of them from the urban residence. This result matched with the study conducted by^[20] who found caregivers were most often female, married, and high school graduates. The majority of caregivers ranged in age from 20-30 years and 41-50 years in the experimental group. Also, the study of^[11] found (76.3%) of caregivers' occupation were housewives. And majority (78.8%) of caregivers were married, also found that (66.2%) of caregiver were coming from rural areas,

Regarding the leukemia history of survivors' adolescents, the present study (**Table 3**) revealed that nearly two-third of them had the family history of cancer and most of them had the onset of disease from 2-3 years. Meanwhile, duration of survivor per month majority of them from 1-2 years and less than three-quarters of them was a survivor from ALL. This result is not matched with^[4] who found the time since diagnosis from 4-8 years ago, while the mean age of diagnosis 7 years. In addition the study by^[3] illustrated that among the 69 ALL cases, 80% of families were consanguineous and 20% were non consanguineous. Also,^[18] indicated that support the hypothesis of familial susceptibility to childhood lymphoma, but do not suggest familial

susceptibility to childhood AL. in the same line the study of^[16] who found that a familial history of solid tumor in first- or second-degree relatives was associated with an increased risk of ALL. Behind the study done by^[15] who reported that survivors of childhood acute lymphoblastic leukemia (ALL) are at risk for late effects of cancer therapy with Five-year ALL survivors (< 21 years at diagnosis).

Concerning the study samples' knowledge regarding secondary tumor pre/post program the present study (**Table 4**) revealed that there was the statistical significant difference between pre and post-program in the knowledge of the study samples regarding signs and symptoms of the secondary tumor, follow up the system, and improve self-esteem and body image ($P<0.05$). Meanwhile, there was the highly statistical significant difference between pre and post-program in the knowledge of the study samples regarding long-term effect from leukemia and treatment and palliative and supportive care ($P<0.01$). This is the same line with the study done in Erbil City by^[11] who recommends updating health interventional program to improve adolescents and their caregiver knowledge about survivor leukemia was effective and important.

In addition this result was agreement with the study done by^[5] who reported that survivor adolescent with leukemia should be counseled regarding the importance of eating a well-balanced diet and participating in regular exercise. The need for web-based networks to improve the knowledge about long-term care, survivor health topics and survivorship plans of childhood leukemia survivors and their caregivers. The intended outcomes would be healthier lifestyles, reduced risk of the morbidities of their prior therapy and appropriate transition to lifelong survivor-specific surveillance. The researchers view that adolescent survivors with leukemia are at increased risk for second cancers, other forms of comorbidity (e.g., cardiovascular disease, diabetes, and osteoporosis) and functional decline.

As regards total knowledge of study sample related secondary tumor pre/post program (**figure 1**) illustrated that there were improve knowledge post-program than pre. This result agreed with the study done in Egypt by^[6] who found more than two third of the caregivers (69.8%) had partially satisfactory knowledge about leukemia, where 30.2% had satisfactory knowledge. This result was in the same line with study of^[5] who

recommended that needs to continuously improve knowledge of adolescent survivors with leukemia which aligned with those health aspects to propose a new paradigm to enhance the wellbeing and healthy lifestyle of adolescent ALL survivors.

As investigating caregiver burden pre/post program (**Table 5**). The current study finding indicated that there were statistically significant differences at ($P < 0.05$) between pre/post caregiver burdens related reduced life satisfaction; wish to run away, health affected by the caregiver. Meanwhile, there highly statistically significant at 0.01 related relationships with others are suffering. This result was agreed with the study by ^[21] who reported that stronger associations between higher levels of caregiver burden and worse quality of life on treatment of children, compared to children off-treatment were negatively linked to caregiver burden and quality of life was moderated by child treatment status. This may be caregivers of survivor adolescent with leukemia suffer from some burden which associated with health-promoting lifestyle.

Regarding health-promoting lifestyle profile pre/post program of the adolescent and their caregivers the finding of the present study revealed that (**Table 6 and Table 7**) there was the highly statistically significant difference between adolescent and their caregiver's pre and post-program related health-promoting lifestyle profile (spiritual growth, physical activity, and nutrition, health responsibility, stress management and interpersonal relation at $P < 0.01$ and $P < 0.05$ respectively. This result was in the same line with ^[12] who reported that screening for late effects on the basis of previous therapeutic exposures, health counseling and promotion of healthy lifestyles are important aspects of long-term follow-up care. It is essential for the adolescent caregivers to provide anticipatory guidance regarding healthy promoting life style and disease prevention aimed at minimizing the risk of future morbidity and mortality.

Moreover, this finding is supported by ^[14] who found that successful health-promoting lifestyle intervention has been highlighted the importance of surveillance guidelines, physical exercise, nutritional supplementation, and dietary habit recommendations. Proper education must provide tactics to improve long-term follow-up and healthy behavior choices. Also, the importance of manage prevention efforts and effectively

promote healthy behaviors to this specialized group of adolescents. Also the study done in London by ^[8] who concluded that an intervention combining print materials and telephone consultations was feasible and acceptable, and associated with improvements in physical activity, diet, and quality of life.

In addition, the study done in Taiwan by ^[23] who finding that after a period of research and self-contemplation, most of the participants adopted a consistently healthy lifestyle, changed their dietary consumption habits, and managed emotional problems that were caused by the disease. Participants who changed to a healthy lifestyle realized benefits in the physical, emotional, and life domains. Also ^[17] who concluded that parents are key agents influencing child diet and physical activity and able to modifiable risk factors for health. The studies that included direct parental involvement showed positive outcomes on a variety of measures suggesting that increasing parental involvement in interventions may be one way to promote long-term lifestyle changes for pediatric survivor cancer. The healthy promoting Lifestyle factors, such as a healthy diet, regular exercise, spiritual growth and stress management may prevent these conditions and improve survivors' quality of life.

As regard correlation between caregiver's burden and their promoting healthy lifestyle pre/post program (**Figure 2**) the finding of the present study illustrated that there was statistically significant between caregiver's burden and their promoting healthy life style. Also, reflect that mild burden of caregivers associated with achieving promoting healthy lifestyle for their adolescent. This in the same line with the study done in Brazil by ^[22] who reflected that caregivers suffer from burden during presented care for their adolescent and affect aspects on quality of life and interventions will promote social and emotional well-being to reduce the burden, improve the quality of life and consequently deliver better care. The researchers view that develop interventions related promoting the lifestyle for the survivor that can reach and effectively promote the long-term lifestyle change, decrease other health problem and improve their quality of life which leads to decrease caregiver's burden.

As regard correlation between adolescent promoting healthy lifestyle with their socio-demographic characteristic (**Table 8**) the finding of the present study revealed that there was statistical significant between age and education level with health responsibility of

adolescent also between education level and physical activity. Meanwhile there was statistical significant between educational level and nutrition ($P < 0.05$); in addition to education level and order of adolescent with spiritual growth. This result in the same line with study done in Israeli by [27] who concluded that health behaviors associated with interpersonal relationships and spiritual growth were more likely to be performed compared to physical activity and good nutrition. Special attention should be placed on promoting physical activity and good nutrition among survivors of childhood cancer with their demographic aspect.

The intended outcomes would be healthier lifestyles, reduced risk of the morbidities of their prior therapy and appropriate transition to lifelong survivor-specific surveillance. he intended outcomes would be healthier lifestyles, reduced risk of the morbidities of their prior therapy and appropriate transition to lifelong survivor-specific surveillance.

CONCLUSION

Based on findings and answering research hypothesis the study concluded that, promoting healthy lifestyle program was effective to improve lifestyle for survivor adolescent with leukemia and their caregivers; in addition, the caregiver's burden was decreased after implementing promoting healthy lifestyle program.

RECOMMENDATION

Based on findings of the present study; the following recommendation can be suggested:

Continue follow-up guidelines for particular groups of survivors' adolescents and their caregivers to discover any changes in health status and maintain healthy behavior lifestyle.

The importance of exploring and dealing with burden of caregivers which consider factors affect promoting healthy lifestyle of survivor adolescent with leukemia

Recommended for generalization the result s when replication on large sample in different hospital settings.

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