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Health Education Program for Adjustment of Mothers having Children Suffering from Leukemia Associated with Hepatitis "C" Virus

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Abstract: **Children with leukemia are at a high risk for hepatitis c infections due to immune suppression secondary to chemotherapy blood, and blood products transfusion during the course of their disease. Role of community health nursing is to prompt healthy behavior to help people to access at various stage of their lives and their ability to accomplish their roles. Health educational program to the mothers of children with leukemia children associated with virus hepatitis "C" will reinforce the family's progress toward understanding the diagnosis, treatment program, side effect and complication of therapy. Aim: This study aimed to evaluate the effects of educational health program for mothers having children suffering from leukemia associated with hepatitis C virus. Setting This study was conducted in Outpatient clinic at National Cancer Institute, Cairo University, Egypt. Subject: It was purposive sample for all mothers accompanying their children suffering from leukemia associated with hepatitis (C) virus (HCV) within nine months. It was 80 mothers. Instruments: As following I) Structured interviewing questionnaire, assessment of mothers knowledge, practice and their adjustment. II) Observational checklist for mothers practices, III) child health assessment. Results: More than one third of mothers 27.5% were secondary school educational level. More than two third 67.5% of children with leukemia associated with hepatitis c virus were male. All children 100% received blood transfusion more than one time. Mothers adjustment toward their children with leukemia associated with hepatitis C virus were less than one fourth 7.5% were good preprogram implementation while post program more than one third 26.3% were good. Conclusion: There was significant positive correlation between knowledge, practice and adjustment preprogram implementation while post program implementation shows that there was highly significant correlation between knowledge, practice and mother's adjustment. Recommendations: Continuous assessment for the level of knowledge and practices of mothers having children with leukemia associated with hepatitis C virus to met their needs.**

Keywords: **Leukemia, Hepatitis "C" Virus, mothers' knowledge and practice.**

1. INTRODUCTION

Leukemia refers to cancer of the white blood cells, which are also referred to as leukocytes. It is a cancer of the bone marrow, the spongy center of the bones that makes blood cells.

Leukemia accounts for approximately 35% of all childhood cancers, approximately 1 in 1000 children diagnosed with leukemia by the age 19. It is more common in children under the age of ten years ***(American Cancer Society (ACS), 2018).***

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Approximately 28,900 new cases or leukemia occur each year in the united states of America (USA), acute lymphocyte leukemia (ALL) is responsible for 1,490 deaths a year in the US, In Egypt the incidence of leukemia over 7 million where survival for children diagnosed with leukemia and subsequently treated is approximately 70% ***(El Said, 2014).***

Children with leukemia are at a high risk for hepatitis c infections due to immune suppression secondary to chemotherapy blood, and blood products transfusion during the course of their disease, 80% of patients infected with the hepatitis c virus, the chromic type, around 45-50% of children who received blood transfusion during course of leukemia, hemophilia treatment developed chronic infection of hepatitis C virus (HVC) ***(Karen and Sharyn, 2016).***

Role of community health nursing as a professional role that promote manage and improve the health of the human being, which is evidenced by professional knowledge that guide the nursing practice, and enhance taking actions to prompt healthy behavior to help people to access at various stage of their lives and their ability to accomplish their roles ***(WHO, 2015).***

Rationale of the study

So there is an important need to conduct this study to determine the health needs and problems of children with leukemia associated with HCV and their family members and to develop a health educational program for the mothers to improve their knowledge practices, adjustment and prevent more incidence of HCV infection transmission to the family members ***(Koh and Valdiserri, 2014).***

AIM OF THE WORK

The aim of this study is to evaluate the effects of educational health program for mothers having children suffering leukemia associated with hepatitis C virus through:

1- Assessing knowledge and practices of mothers to determine health needs of children having leukemia associated with hepatitis C virus.

2- Assessing the health status of children suffering form leukemia associated with hepatitis C virus.

3- Assessing mothers' adjustment.

4- Designing and implement health needs

5- Evaluating the effect of program improvement of mothers' knowledge practices and adjustment.

Research hypothesis:

Health educational program will improve of mothers' adjustment, knowledge and practice toward their children suffering from leukemia associated with hepatitis C virus.

2. METHODS

I- Research Design

A quasi-experimental design was utilized.

Research Design

A descriptive design was used to conduct this study.

The subjects were selected according to the following criteria:

- Mothers accompanying their children suffering from leukemia associated with hepatitis © virus (HCV). It was 80 mothers according to the inclusion criteria:

▪ Age of child over 6 years diagnosed with leukemia since 1 or 2 years suffering from (HCV) and exclusion criteria without complication from HCV infection.

Instruments:

To achieve the aim of the study three tools were developed and utilized by the researcher for data collection these are as follow:

Instrument 1: Structured interviewing questionnaire: it was developed by the researcher and divided into five parts as follow:

a- Demographic data for mothers it consists of 7 closed ended questions that included: age, educational level, social status, working during care of the child, income, family number and room number.

b- Sociodemographic data of the children it consist of 3 closed ended questions that included, age, gender, level of education.

c- Concerned to mothers' knowledge about leukemia, treatment side effect of treatment, and hepatitis C virus infection this part was used pre and post program, it consists of 20 close ended questions: included, meaning of leukemia, factors contributing to leukemia, signs and symptoms of leukemia, steps for therapy phase, duration of time needed to treat disease, Drug taken during follow up, methods of choosing child medication, importance of follow up, signs of infection, methods of child protection from infection and communicable diseases, role to keep child nutrition in a good pattern, keep personal hygiene, prevent of bleeding from anybody orifice, ways to keep the chemotherapy at home, causes of child anemia, signs and symptoms of anemia, treatment of anemia, medication not to be given if not prescribed, modes of virus C infection transmission, expected health problem with virus C infection, side effects of chemotherapy on gastrointestinal systems, side effects of chemotherapy on the long run, side effects of radiotherapy on the neck, this part was used pre and post the program.

Scoring system:

Answer of mothers regaling the knowledge items were classified into two levels: (a) correct answers were scored as 1, (b) incorrect answers were scored as zero for each area of knowledge, the score of the items was summed up and the total was divided by the number of items, giving the mean score for each part. These score were converted into percent score, also means and standard deviation were computed, knowledge score level (a) satisfactory if the score was 50% or more (b) unsatisfactory if the score was (<50%).

d- Concerned to the mothers regarding to their reported practices toward their care of children. Suffering from leukemia associated with HCV such as: way to measure axillary temperature, health care of the child when temperature is above 38%, role for protecting the incidence of mouth inflammation, role toward nasal bleeding, role toward the child to give chemotherapy at home, role toward the child after giving subcutaneous injections, role to protect the skin of the child and role to control virus C infection and prevent transmission, practices items were classified into two score levels (a) satisfactory was scored as 1, (b) satisfactory the final score of mothers responses was classified either 60% and above considered satisfactory or less than 60% considered unsatisfactory.

- Concerned to the mothers adjustment toward care of their children suffering from leukemia associated with virus C, modified from ***AlMommani et al. (2015)*** consists from 12 items closed ended questions, ranges from (1) always, (2) sometimes, (3) never, these items include think of other matters, keep thinking of my child illness, avoid despair and pay to god refuse to confess my child sickness, by busy to keep away from my emotions, ask other families with same problem how they deal, reassure myself that everything will be good, make new friends relationship and try to involve with them, avoid what decrease my effort caring my child, spend much time watching TV to feel my child's sickness less, accept and satisfy my reality, and hid my child's disease from others. **Scoring:** From 24-36 Good Adjustment, 12-23 moderate adjustment, 0-11 Mal adjustment.

Instrument 2: Observation chick list, it was concerned with mothers practices regarding. Ways to measure axillary temperature, and role for protecting the incidence of mother inflammation. This part was used before and after the program.

Scoring: Responses of mothers regarding their practices items were classified into two score levels (a) satisfactory scored a 1, (b) unsatisfactory was scored as zero for each item. The score of total items were summed-up and divided by the number of the items, giving the mean score value. These score were converted into percent score, means and stander deviation were computerized satisfactory practices of mothers were considered if the total percent score was 65% and unsatisfactory if the total percent score was <65%.

Instrument 3: It include ***laboratory investigation*** it consists of (7) closed ended questions include, temperature, pulse, hemoglobin, rattled count, white blood cells count, liver function, and serum creatinine. Past and current ***physical history*** it consists of (16) closed ended questions that include, onset of leukemia, frequency of hospitalization, duration of virus inflection, receiving blood transfusion, frequency of blood transfusion, surgical operation before, family history of virus C, feel abdominal pain, feel abdominal distension, feel nausea, having yellow urine, having yellow steel, having dry mouth and eyes, having skin

itching, having headache, having less to appetite, feel tired and exhausted, walk as usual, fell sleeping during the day time, feel joints pain, having muscles spasm, go upstairs without pain or dyspnea. Go to school daily. ***Psychosocial and personal*** status of the children, it consists of (14) closed ended questions that included, feel sad and isolation, feel worry toward my family, feel that my disease will become very dangerous problem, feel mistrust of myself, can concentrate during class, can learn new things, can remember previous lessons, care of my family, be happy with my family members, be happy with my friends, help to arrange my room, go to buy simple things for my mother, practice hobbies, participate in school activities.

Methods:

A written permission was obtained from the faculty of Nursing was delivered to the responsible authorities of the hospital (the hospital director to conduct the study about patients clinic then a written approval was obtained after explaining the aim of study.

Tools development: All tools of present study were developed by researcher after extensive reviewing of relevant literature. To identify the framework of concepts under investigation and its dimension. Tools reviewed by three expertise of community health nursing Faculty of Nursing, Ain Shams University. Pilot study was done after developing the tools on 8 participants (10% of the sample) who were not included to the total study sample, based on the results of the pilot study, required modification were done to ensure directions and unambiguousness.

Administration and ethical concern: the proposal for the study was given to research ethics committee in the nursing colleague to be reviewed and evaluated. The present study satisfies the standards of ethics in research involving protection of human rights. Administrative process and written agreement were taken to get permission for carrying out the study. Active informed consent prior to study participants. Current study was run with cautious attention to ethical principles.

Procedure: The study was conducted over a period of 9 months, it carried out in seven sessions (timed allowed seven hours, distributed on seven sessions, three hours of theory and four hours of practices, the actual works started by meeting the mothers with their children at oncology clinic first the investigator introduced herself to the mothers and give a brief idea about the study and its aim. The questionnaire was filled in by the investigator for illiterate mothers to estimate the knowledge, needs and practical needs using pretest questionnaire. The emotional needs were tested using adjustment scales. The interview lasted for 30 minutes for each mothers. Program implemented on (10-15) mothers in each session, the class includes (seven sessions). Each session lasted 45 minutes for two days per week during the session the investigator used discussion and pictures (in the first session the investigator gave mothers an illustrated booklet) to recognize the different items of the educational program and identify all objectives for educational program. For knowledge about leukemia, liver and virus C infection need. Two session for each group of mothers. The information was given through theoretical part included, blood component, signs and symptoms of leukemia, treatment of leukemia and its side effects, basic knowledge about liver, mode of transmission of HCV and precaution to be taken to control HCV transmission, for practical part needs three sessions for each group of mothers about personal hygiene to the child, mouth care of the child, cause of fever and common sites of cold compress, measuring of axillary temperature, principles of skin care, as preventive measures to control HCV infection and bleeding control one session for each group of mothers, include health promotion, specific protection for viral hepatitis C infection and control of bleeding teaching methods and media used were lectures, groups discussion, demonstration and remonstration. Suitable teaching aids prepared especially for the program were used such as printed materials, for program evaluation to evaluate the level of improvement knowledge, adjustment and practices through implementation of post-test after the program of the program implementation with one week and took three weeks to be done.

Statistical analysis:

Data was entered and analyzed using Statistical Package for Social Science statistical package version 22 (SPSS) program. Graphics were done using Excel program.

3. RESULTS

Table (1) shows that more than one fourth (25.5%) of studied mothers level of education were secondary school, more than one third (37.5%) of mothers worked part time, also most of them (87.5%) had insufficient income.

Figure (1) showed that less than one fourth (15%) of mothers under study had inadequate knowledge about leukemia and virus C infection preprogram implementation while post intervention the majority (86.3%) of them had improvement of their knowledge.

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Figure (2) showed that this figure showed that less than one fourth (15%) of mothers under study had inadequate knowledge about leukemia and virus C infection pre program implementation while post intervention the majority (86.3%) of studied mothers got improvement of their knowledge

Figure (3) showed that the mother's adjustment toward caring of their children, less than one fourth 7.5% of mothers had good adjustment, more than half 57.5% of them were moderate adjustment and one third 35% of them were poor adjustment pre program implementation, while post program more than one third 26.3% were good adjustment, more than three quarters 61.3% were moderate adjustment and more than one fourth 12.5% were poor adjustment.

Table (2) shows that there is highly significant positive correlation between knowledge and practices of mothers preprogram (r=738, p value 0.000^{+++}) while post program it shows that highly significant statistical correlation between mothers knowledge and their satisfactory practice (r=890, p value $.000^{+++}$). Table shows that there is positive correlation between total practice and total health pre program (r=0.088, p value = .436) while post program there is highly significant statistically correlation between them (r=.359, p value = 0.001^{++}). Table (2) also shows that there is a correlation between mothers adjustment and practices (r=0.104, p value = 0.357) pre program while post program shows highly significant correlation between adjustment of mothers and their practices (r=0.267; p value = 0.017^{+}).

Table (3) shows that there is positive relation between education of mothers and demographic characteristics preprogram it was (X^2=37.219 with p value = 0.000^{+++}) while post program there is highly significant positive correlation between knowledge and education (X^2= 46.271 with p value = 0.000^{++}). As regard there was significant relation between knowledge and occupation of mothers, it was pre program (X^2= 8.513 with p value = 0.014^{+}) while post program there was no significant relation between mothers occupation and their knowledge (X^2= 2.53, with p value 0.282). Also there is positive relation between mothers knowledge and their income pre program (X^2= 5.602, P value = 0.018) while post program there is no significant relation between mothers knowledge and income (X^2= 1.822, P value = 0.177).

Table (4) shows that there is positive correlation between social status and total practices preprogram (X^2=1.686, P value = 0.431) while post program correlation was highly significant (X^2= 6.788, p value 0.034^{+}). Also correlation between education and practices it shows significant positive correlation (X2=36.932 with P value 0.000^{++}) preprogram while post program shows highly significant correlation (X^2=13.148, P value 0.011^{+}).

Also the table shows that there is positive correlation between mothers' income and their practices (X^2=2.857, P value 0.091) preprogram while postprogram there is highly significant correlation (X^2=1.27, P value 0.26).

Table (1): Frequency distribution of studied mothers regarding their demographic characteristics (n=80).

Characteristics of Mothers	No	%
Age		
<35 years	18	22.5
35-<40years	32	40.0
40+	30	37.5
Min –max	25-48	
Mean ±SD	37.65±5.53	
Social status		
Married	66	82.5
Devorced	6	7.5
Widow	8	10.0
Level of education		
Illtrate	12	15.0
Elementary	16	20.0
Secondary	22	27.5
University	20	25.0

Other	10	12.5
Occupation		
Work part time	30	37.5
Work Full time	28	35.0
Not working	22	27.5
Income		
Sufficient	10	12.5
Insufficient	70	87.5
Family Numbers		
3	4	5.0
4	38	47.5
5	28	35.0
6	10	12.5
Room number		
2	66	82.5
3	14	17.5

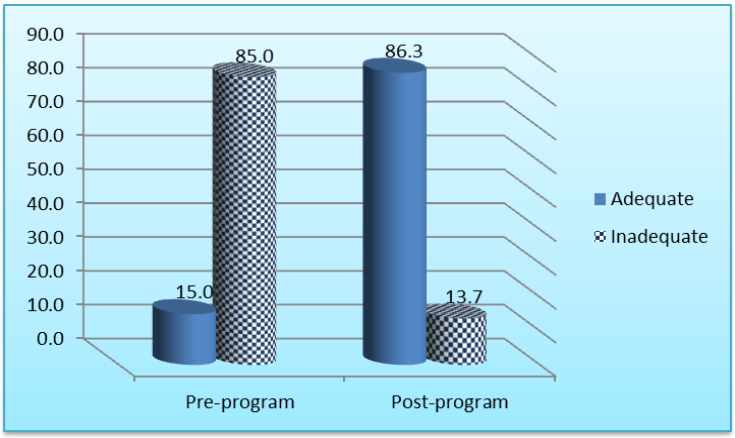

Figure (1): Percentage distribution of studied mothers regarding their total knowledge pre and post program

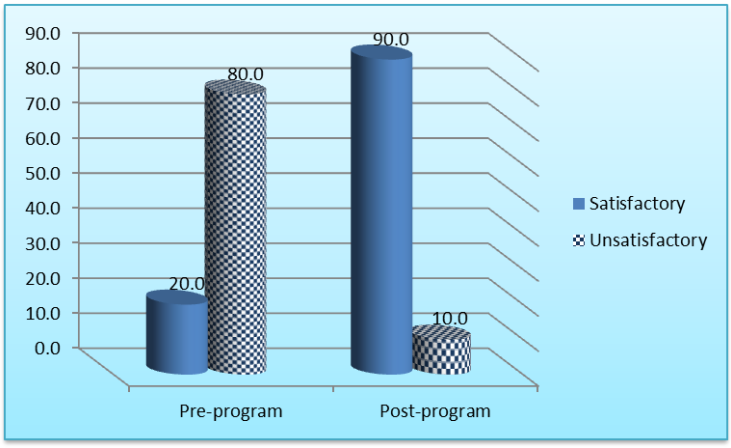

Figure (2): Percentage distribution of studied mothers regarding their total reported practices pre and post program

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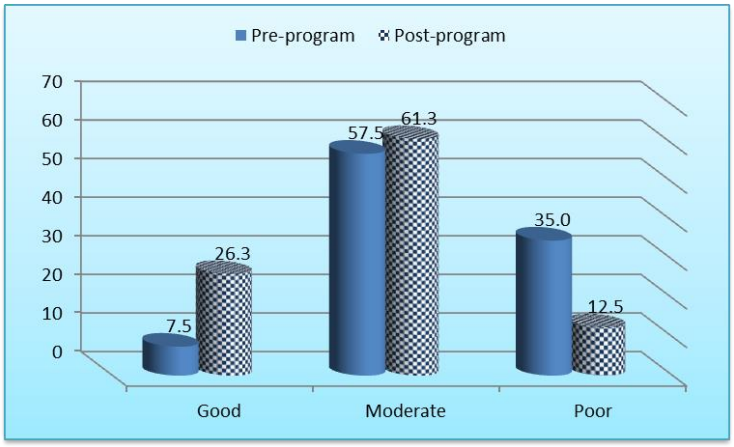

Figure (3): Percentage distribution of studied mothers regarding their total adjustment pre and post program

Table (2): Correlation matrix between total knowledge, practices, health, and adjustment pre and post program

		Pre			Post		
		Total practices	**Total health**	**Total adjustment**	**Total practices**	**Total health**	**Total adjustment**
Total knowledge	r	.738	0.127	.418	.890	.322	0.304
	p-value	.000**	.262	.000**	.000**	.004*	.006*
Total practices	r		0.088	.104		.359	0.267
	p-value		.436	.357		.001**	.017*
Total health	r	0.088-		.002	.359		0.164
	p-value	.436		.988	.001**		.146
Total adjustment	r	.104	.002		0.267-	0.164	
	p-value	.357	.988		.017*	.146	

Table (3): Statistically relation between studied mothers total knowledge and their demographic characteristics pre and post program

	Pre				X^2	p-value	**Post**				X^2	p-value
	Inadequate (n=68)		**Adequate (n=12)**				**Inadequate (n=11)**		**Adequate (n=69)**			
	no	**%**	**no**	**%**			**no**	**%**	**no**	**%**		
Age												
< 35	16	23.5	2	16.7	0.959	0.619	1	9.1	17	24.6	5.703	0.058
35-40	28	41.2	4	33.3			8	72.7	24	34.8		
40+	24	35.3	6	50.0			2	18.2	28	40.6		
Social Status												
Married	56	82.4	10	83.3	1.687	0.43	9	81.8	57	82.6	1.811	0.404
Devoiced	6	8.8	0	0.0			0	0.0	6	8.7		
Widow	6	8.8	2	16.7			2	18.2	6	8.7		
Education												
Illteratue	12	17.6	0	0.0	37.219	.000**	9	81.8	3	4.3	46.271	.000**
Elementary	16	23.5	0	0.0			2	18.2	14	20.3		
Secondary	10	14.7	12	100.0			0	0.0	22	31.9		
University	20	29.4	0	0.0			0	0.0	20	29.0		

Other	10	14.7	0	0.0			0	0.0	10	14.5		
Occupation												
Work part time	24	35.3	6	50.0	8.513	.014*	4	36.4	26	37.7	2.53	0.282
Work full time	22	32.4	6	50.0			2	18.2	26	37.7		
Not work	22	32.4	0	0.0			5	45.5	17	24.6		
Income												
Sufficient	6	8.8	4	33.3	5.602	0.018	0	0.0	10	14.5	1.822	0.177
Insufficient	62	91.2	8	66.7			11	100.0	59	85.5		

Table (4): Statistically relation between studied mothers total practices and their demographic characteristics pre and post program

	Pre				X^2	p-value	Post				X^2	p-value
	Unsatisfactory (n=64)		Satisfactory (n=16)				Unsatisfactory (n=8)		Satisfactory (n=72)			
	No	%	No	%			No	%	No	%		
Age												
< 35	14	21.9	4	25.0	0.087	0.958	0	0.0	18	25.0	2.593	0.274
35-40	26	40.6	6	37.5			4	50.0	28	38.9		
40+	24	37.5	6	37.5			4	50.0	26	36.1		
Social Status												
Married	52	81.3	14	87.5	1.686	0.431	4	50.0	62	86.1	6.768	.034*
Devoiced	6	9.4	0	0.0			2	25.0	4	5.6		
Widow	6	9.4	2	12.5			2	25.0	6	8.3		
Education												
Illteratue	12	18.8	0	0.0	36.932	.000**	4	50.0	8	11.1	13.148	.011*
Elementary	16	25.0	0	0.0			2	25.0	14	19.4		
Secondary	8	12.5	14	87.5			0	0.0	22	30.6		
University	18	28.1	2	12.5			0	0.0	20	27.8		
Other	10	15.6	0	0.0			2	25.0	8	11.1		
Occupation												
Work part time	22	34.4	8	50.0	7.619	.022*	0	0.0	30	41.7	5.541	0.063
Work full time	20	31.3	8	50.0			4	50.0	24	33.3		
Not work	22	34.4	0	0.0			4	50.0	18	25.0		
Income												
Sufficient	6	9.4	4	25.0	2.857	0.091	0	0.0	10	13.9	1.27	0.26
Insufficient	58	90.6	12	75.0			8	100.0	62	86.1		

4. DISCUSSION

The results of the present study revealed that one fourth of mothers were graduated from secondary school and more than one third worked part time, moreover, the majority of mothers and insufficient income, this result of educational level supported by ***Suzanne et al. textbook of medical surgical nursing (2019)*** who mentioned that for patients and mothers adjustment they have to understand of what is happening to them, based on their educational, literacy level and interest, teaching of mothers and children should focus on the disease, its treatment risk of infection and bleeding, regarding insufficient income, this reflect disease, treatment and supportive care cost. This finding is consistent with what was reported with the research study of ***El-Akel et al. (2017)*** in Egypt which titled national treatment program of hepatitis C in Egypt: Hepatitis C virus model of care "Who stated that the majority of treated patients were totally sponsored by the government.

Figure (1) showed that less than one fourth of mothers under study had inadequate knowledge preprogram while post intervention the majority of studied mothers got adequate and satisfied level of knowledge. This results supported by ***Bath***

(2015) who stated that the basic knowledge that caregivers use to make decision and solve problems, provides the formation for developing and improving skills through guidance, counseling and direction from health team members which entrance taking appropriate action and provide best care to their children.

Figure (2) shows that (80%) of studied mothers had unsatisfactory reported practices toward caring of their children with leukemia associated with virus C infection preprogram while the majority (90%) of them got satisfactory reported practices toward their children post program implementation. This result supported by ***Fisher et al. (2018)*** who studied impact of teaching program on mothers' knowledge attitude and practice about their children with leukemia and found that knowledge of mothers was increased and there was a statistical significant difference in mothers knowledge scores before and immediately after education. Also this results supported by ***Fouad (2018)*** who reported that family caregiver's knowledge had an impact on their practice which help them in practicing correctly and satisfactory regarding their leukemic children.

Figure (3) mentions that mothers of children with leukemia associated with Virus C their adjustment toward caring of their children less than one fourth of mothers had good adjustment, more than half of them were moderate adjustment and more than one third were poor adjustment pre program implementation while post program more than one third were good adjustment, more than three quarters were moderate adjustment and more than one fourth were poor adjustment, which mean that there is enhancement regarding adjustment post program. This results supported by ***Bahy (2015)*** mentioned in relation to caregivers' anxiety level. Results of the study indicate improvement after implementation of discharge plan and majority of the caregivers had no and mild anxiety. This results was supported by the results of ***El Sayed (2013)*** who studied the impact of supportive care for mothers of children with brain tumor on their coping in pediatric and reported that, mothers who received supportive care experienced less level of anxiety and depression than those who did not. Also, this result was supported by ***Kunswa (2016)*** who studied the effect of nursing intervention on stressors and adjustment patterns of mothers having preterm infants and found the highest mean scores of maternal stressors for the studied mothers in both groups were in parental role alteration. These findings reflect that, change in the mothers' role was the most stressful, not being able to meet their infants' needs of basic care was a clear cause of stress.

Table (2) shows that the correlation between total knowledge of mothers having children with leukemia associated with virus C infection, their practices, adjustment and health status of their children. It shows that there is highly significant positive correlation between mothers knowledge practices and their adjustment preprogram implementation mean while post program intervention it describes that there positive highly correlation between mothers knowledge practices and their adjustment toward caring their children.

The study revealed that correlation between mothers knowledge and health status of their children it shows that no significant correlation between mothers knowledge and children health status preprogram implementation. While there was high significant correlation between mothers knowledge and their children health status after program implementation. This finding correlated with ***Alexander (2018)*** who stated that there was highly significant association between mother's knowledge and their practices for providing care for their children. Also these results were in agreement with results of ***Nair et al. (2017)*** who found that the majority of caregivers had deficient knowledge regarding causes, symptoms of disease and importance of nutrients, after management program, knowledge of the specific diagnosis, health problem of child, details of treatment, its complication and side effects. This knowledge can help caregivers to provide good caring, implement appropriate intervention and relieve stress and tension of caregivers so they can cope with the situation and also trust medical staff relieve their confusion and misunderstanding of child condition. Parents differ in how much information they needed or felt they can handle about the disease.

Moreover, these results were supported by ***Dawood et al. (2017)*** who studied parent's knowledge and management of their children's aliments in Malaysia and reported that, parents often had inadequate knowledge and misconcept for treating their children about sore throat, fever, cough, infection and diarrhea. In addition, parent with better and higher medical knowledge had better means of managing their children's ailments and better means of adjustment toward caring their children to meet their health needs.

Similarly, these results was supported by ***Kupst and Patenaude (2017)*** who studied parent and adolescent adjustment to pediatric cancer associated with coping social support and family function and reported that, during the diagnosis and treatment of children's cancer, more than half of their mothers and more than one third of their fathers experienced high level of distress. Also, these results were in agreement with ***Bragadottir (2013)*** who reported that, level of depression and anxiety for mothers

showed statistical significant improvement in depression. These results were contradicted with ***Quinn et al. (2015)*** who documented that, anxiety and depression increased for parental stress symptoms post treatment compared with parents after the end of treatment.

Table (3) shows that regarding the relation between total knowledge and age of mothers of children with leukemia associated with virus C, current study revealed that no significant relation between mother's knowledge and their age pre and post program. In assessing the relationship between mothers' age and knowledge findings of the current study revealed that, there was no relation, this result was supported by ***Kunswa (2016)*** who revealed that there was no statistical significant relation between mothers' age and their knowledge in both groups post intervention and at follow up, whereas all mothers in all ages needed enough knowledge and information about child illness which considered as actual support to reduce their anxiety, and promote their confidence and coping skills.

The study shows that no significant relation between social status and knowledge, from researcher point of view. The results confirm that mother of child with leukemia associated with virus C either married or divorced still need more knowledge about what her child needs to improve her practice and proper adjustment toward her child. This study supported by ***Mohamed and Mostafa (2018)*** who reported that there is no statistical relation between marital status and mothers knowledge.

The study shows that there is high significant relation between total knowledge and mothers level of education. Before and after implementation of health education program, which means that the level of mother education allow them to be able to understand their children symptoms, can deal with problems, and communicate with medical staff to understand prognosis of disease. This result supported by the result of ***Hassan et al. (2018)*** who showed highly significant association between caregivers' knowledge and level of education.

The study finding is supported with the research study of ***Gardella et al. (2017)*** which titled "Hepatitis C awareness among adolescent in the Alpes-Maritimes area of France" in France who stated that there was a highly statistical significant relation between knowledge and level of education.

The study revealed that there is significant relation between occupation and income of mothers having children with leukemia associated with virus c infection. This before implementation of health education program while after implementation of the program there is no significant relation between mothers occupation and income, from the researcher point of view this may be due to that most of the mothers were married and have chronic ill children and have the desire to avoid any problems of the disease in order to take care of their children and continue their live normally.

The study showed that there is no significant relation between mothers' total practices toward their children and their age and income from the researcher point of view, it may due to their belief that this disease is a fatal disease (Table 4), this finding is in the same line with the researcher of ***Fisher et al. (2018)*** which titled "knowledge of hepatitis C status moderates the relationship between history of drug treatment and sterile syringe use" who found that there was no statistical significant relation between age and practices. Regarding relation between mothers' education and their total practices there is high significant relation between mothers education and their total practices while there is no significant statistical relation between mothers' social status and their total practices before health education program implementation while after program implementation relation is significant between mothers' total practices results and their education and social status. This results is in agreement with the researcher study of ***Mohamed and Mostafa (2018)*** which titled "the effect of educational intervention on self care practices and expected clinical outcome in patients undergoing liver transplantation" who reported that there was significant relation between education, social status and self care practices.

The study illustrate the there is statistical significant relation between mothers' total practices and their occupation. This before the health education program implementation while after implementation of the program it showed that there is no statistical relation between mothers' total practices and their occupation which showed from the researcher point of view the impact of the program on the mothers for caring their ill children.

5. CONCLUSION

There was significant positive correlation between knowledge, practice and adjustment pre-intervention while post educational intervention shows that there was highly significant correlation between knowledge, practices and mother's adjustment.

6. RECOMMENDATION

- Continuous assessment for the level knowledge and practice of mothers having children with leukemia associated with hepatitis C virus to met their needs.

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- None

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