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## Effect of Educational Program for Mothers of Children with Pediatric Oncology Regarding COVID-19 Knowledge, Attitudes, and Practices

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### ABSTRACT

**Background:** Mothers of children with cancer often feel helpless in meeting their child's healthcare needs and in sustaining their family lives which increased during the pandemic. **Aim:** This study aimed to evaluate the effect of educational program for mothers of children with pediatric oncology regarding COVID-19 knowledge, attitudes, and practices. **Method:** A quasi-experimental (pre-post-test) research design was used. A convenience sample of 120 mothers of children who were diagnosed with cancer and admitted to the pediatric oncology department or attending the pediatric oncology outpatient clinic at South Egypt Cancer Institute in Assiut City. **Three tools;** Children and their mothers' characteristics, COVID-19 knowledge questionnaires and knowledge about attitude and practice toward COVID-19. **Results:** The study results detects that minority of mothers had a good score of knowledge before program increased to 95.0 % after program ( $p < 0.001^{**}$ ). Also, more than half of mothers had satisfactory knowledge about attitude and practice level before the program which reached 98.3% after program ( $p < 0.001^{**}$ ). **Conclusion:** Mothers' knowledge significantly improved after the program application. Likewise, the mothers' knowledge about attitudes and practices toward COVID-19 changed positively and significantly enhanced after the educational program. **Recommendations:** Continued educational programs regarding COVID-19 help the mothers improve their knowledge, attitude and practices.

**Keywords:** Attitudes, COVID-19, Knowledge, Mothers, Pediatric.

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## 1. Introduction

During late 2019 and early 2020, a new fatal disease called Corona Virus Disease-2019 (COVID-19) broke out in China and Southeast Asia. The main symptoms of COVID-19 have been identified as fever, dry cough, fatigue, myalgia, shortness of breath, and dyspnea. The World Health Organization (WHO) announced that the COVID-19 outbreak had become a public health emergency of international concern on January 31, 2020 and then categorized it as a pandemic on March 11, 2020 (**Sun et al., 2020 and Al-Hanawi et al., 2020**).

Cancers in the pediatric population differ significantly from those in adults, particularly in the diagnoses seen and the availability of qualified health care. The COVID-19 pandemic may have exacerbated the imbalance of pediatric cancer outcomes among low and middle income countries. There were reports globally on the cancellation of elective health services including pediatric surgery and radiotherapy, essential outpatient services, shortage of necessary medications, delays in diagnosis, hospital inpatient services being overwhelmed, and health care staffing issues (**Global Health Research Group on Children's Non-Communicable Diseases, 2022**).

Most pediatric cancers behave aggressively, requiring immediate treatment,

and may need long periods of intensive chemotherapy with multiple antineoplastic agents. In contrast, they respond better to the treatment and are considered of good prognosis when compared to adults. In addition to the concern with Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2) infection in children with cancer, there is a fear of delay in the diagnosis and treatment of these patients due to the difficulties caused by the pandemic (**Lima et al, 2021**).

Regarding the declaration of the COVID-19 pandemic, mothers of children who experience the oncological disease or its recovery faced the following question: "How are childhood cancer and COVID-19 related?" informational support for these mothers is essential; it integrates their coping process, as well as eases stress, uncertainties, and insecurities. The trajectory of the disease and the treatment of childhood cancer require mothers to make decisions. Thus, correct information is needed to avoid misinformation and/or information overload which may lead to a negative impact on diseased children's life (**Phillips et al, 2019, Robertson et al, 2019 and Wernet et al, 2021**).

Public adherence to preventive measures established by the government is of prime importance to prevent the spread of the disease. Adherence is likely to be influenced

by knowledge and attitudes toward COVID-19. Evidence shows that public knowledge is important in tackling pandemics. By assessing awareness and knowledge about the coronavirus among mothers of children suffering from cancer, deeper insights into existing perceptions and practices can be gained, thereby helping to identify attributes that influence their adopting healthy practices and responsive behavior specifically with those risky children. Assessing knowledge is also important in identifying gaps and strengthening ongoing prevention efforts (Al-Hanawi et al, 2020).

### **Significance of the study:**

The COVID-19 pandemic affects all age groups and presents differently in children from adults. Children who contract the virus while suffering from cancer may face unique health challenges than their counterparts. Reports suggested that cancer was a risk factor for the severity of infection with a hazard ratio of 3.56. Mothers who have children with chronic health conditions such as cancer often feel helpless in meeting their child's healthcare needs and in sustaining their family lives which increased during the pandemic (Arief and Rachmawati, 2019, Mirlashari et al, 2020 and Kutluk et al, 2021).

During the COVID-19 outbreak, people have received a large volume of information that could lead to confusion, for example,

contamination risks during chemo or/and radiotherapy appointments for children with cancer. It is important to know if there are any misconceptions so that nursing professionals can help in increasing mothers' knowledge through health education interventions. Thus, the present study aimed to investigate the effect of an educational program on mothers' knowledge, practices, and attitudes regarding COVID-19 with their children who are diagnosed with cancer.

This study aimed to evaluate the effect of educational program for mothers of children with pediatric oncology regarding COVID-19 knowledge, attitudes, and practices.

### **Research Hypotheses:**

#### **Alternative Hypothesis (H1):**

The educational program is expected to improve the mothers' knowledge regarding COVID-19.

#### **Alternative Hypothesis (H2):**

The educational program is expected to change positively the mothers' attitudes regarding COVID-19.

#### **Alternative Hypothesis (H3):**

The educational program is expected to enhance the mothers' practices regarding COVID-19.

### **Subjects and Method:**

#### **Study Design**

A quasi-experimental (pre-post-test) research design was used in this study.

**Study Setting:**

The study was conducted at the pediatric oncology department and outpatient clinic at South Egypt Cancer Institute in Assiut City. The pediatric oncology department was created in 1989. It has 24 nurses who introduce nursing care for ill children in the unit. The pediatric oncology department includes 20 rooms with 96 beds for general, ICU, isolation, and immunity rooms and the out-patient clinic providing for follow-up services for children.

**Study Subjects:**

A convenience sample of 120 mothers of children who were diagnosed with cancer and admitted to the pediatric oncology department or attending the pediatric oncology outpatient clinic at South Egypt Cancer Institute in Assiut City was included with the following inclusion criteria:

**Inclusion Criteria:** The study subjects included mothers of children who were:

- 1) Admitted to the pediatric oncology department or attending the pediatric oncology outpatient clinic during the study period.
- 2) Willing to participate in the study.

**Sample size:**

The sample size was calculated using EPI Info version 7 by calculating attitude and practice toward COVID-19 according to a

pilot study (12 mothers) by comparing two proportions with a 5% margin of error, a confidence level of 95%, and a response distribution of 80%. Mothers' practice level before education was 40% and after education was 60%. It was calculated that the minimum sample size required is 107 for each period. It increased to 120 to compensate for any withdrawn cases.

**Tools of Data Collection:**

**Three tools** used in this study:

**Tool one: A structured interview questionnaire** involved children and their mothers' characteristics. It designed especially to collect the required data for this study and included two parts:

**Part 1: Mothers of children's characteristics** as; age, education, residence, if they were suffering from any chronic diseases, if yes: What's the diagnosis? and the number of children.

**Part 2: Children's characteristics** as; age, sex, diagnosis, and duration of illness.

**Tool two: COVID-19 knowledge test (C19KT) questionnaire:** A structured interview questionnaire. It was adapted after a thorough review of literature from previous research by **Haque et al. (2021)**. It consisted of 46 questions used to assess knowledge of mothers regarding COVID-19 pandemic. Questions covered various aspects of knowledge such as: COVID-19's

definition, causative organism, clinical manifestations, methods of transmission, treatment....etc. The answers were: Yes, No, not sure, and I don't know. Each correct answer was given one mark and the incorrect answer was given zero. The mothers' knowledge was considered accurate according to the literature.

**Tool two scoring:** The maximum score was 92 and minimum score was zero. Each item of mothers' knowledge was categorized into 3 classes; correct and complete =2, correct and incomplete=1, and incorrect or didn't know=0. According to **Rashwan et al., (2014)** the mothers' knowledge was scored as follow: Poor = <50% (less than 46 score). Average = 50-65% (46 to less than 55 score). Good=  $\geq 65\%$  (55 score and more).

**Tool three: Knowledge about attitude and practice towards COVID-19 questionnaire:** It was adapted from **Haque et al., (2021)**. It included two parts:

**Part 1: Knowledge about mothers' attitude and practice towards COVID-19 questionnaire.** It was used to assess the knowledge about mother's attitude and practice towards COVID-19. It had consisted of 24 questions such as: Hand washing with soap or alcohol, use mask regularly and how many times, kept social

distances, sneezed between elbows, frequently touched mouth or eyes or nose....etc. The answers were: Yes, No and not sure. Total scores were obtained by summing across all items: Higher scores were indicating positive attitude and enhanced practice.

**Tool three scoring part (1):** The maximum score was 48 and minimum score was zero. Each item of mothers' knowledge about practice was categorized into 3 classes; correct and complete =2, correct and incomplete=1, and incorrect or didn't know=0. The mothers' knowledge about practice and attitude was scored as follow: satisfactory if  $\geq 50$  ( $\geq 24$  score)., while a score < 50% (less than 24 score) was considered unsatisfactory.

**Part 2: Knowledge about attitude and practice of mothers towards COVID-19 in caring with their children questionnaires.** It was used to assess the knowledge about attitude and practice of mothers towards COVID-19 in caring with their children questionnaires. It had consisted of 19 questions such as: Your child wash his/her hands with soap or alcohol, use mask regularly and how many times, kept social distances, sneezed between elbows, frequently touched mouth or eyes or nose...etc. The answers were: Yes, No, and not sure. Total scores

were obtained by summing across all items: Higher scores were indicating positive attitude and enhanced practice.

**Tool three scoring part (2):** The maximum score was 38 and minimum score was zero. Each item of mothers' knowledge about practice was categorized into 3 classes; correct and complete =2, correct and incomplete=1, and incorrect or didn't know=0. The mothers' knowledge about practice was scored as follow: Satisfactory if  $\geq 50\%$  ( $\geq 19$  score), while a score  $< 50\%$  (less than 19 score) was considered unsatisfactory.

#### **Method of Data Collection:**

**Ethical considerations:** A study proposal was prepared by the researchers and it was accepted by the Ethical Committee of the Faculty of Nursing. After that; written consent obtained from the mothers who were willing to participate in the study, after clarifying the nature and purpose of the study. Confidentiality and anonymity were ensured. Also, the researchers confirmed that the research paper was following the common ethical principles in clinical research.

- **Study tools validity and reliability:** The study tools were translated into Arabic by the researchers and tested for their content **validity** index by five experts in the pediatric nursing and community health

nursing field at faculty of nursing at Assuit University. It was done using 5 points Likert scale (from very related (5) to very not related (1)). The content validity was calculated by the sum of very related and related items on the sum of total items of the sheet in a total of five experts. **Validity** index was 0.86 for tool one, 0.91 for tool two, and 0.93 for tool three. **Reliability** of the tools were investigated by test-retest reliability methods by using alpha - Cronbach's test. **Reliability** for tool one was 0.86, tool two 0.89, and tool three 0.88.

- An official permission was obtained from the head of pediatric oncology department and pediatric oncology outpatient clinic at South Egypt Cancer Institute in Assiut.
- **Pilot study:** The pilot study was applied to 12 (10%) mothers of children at pediatric oncology unit. It was done to evaluate the applicability and clarity of the tools and to determine the time involvement. According to the pilot study no modifications were done and the mothers in the pilot study were added in the total sample.
- **Educational program:** It was designed by the researchers depending on the pertinent literary text. It was aimed to evaluate the effect of educational program on mothers' knowledge,

practices, and attitudes toward COVID-19 at pediatric oncology unit. **Objectives of the educational program were to;** improve the mothers' knowledge regarding COVID-19, positively change the mothers' attitudes regarding COVID-19, and enhance the mothers' practices regarding COVID-19. The program was implemented through four phases as the following:

**I-Assessment phase:** The researchers assessed the children and their mothers' characteristics as mentioned in tool one (part 1 & 2).

**II-Planning phase:** The researchers arranged for carrying out the program such as teaching place, sessions, audiovisual aids, handouts....etc.

**-Teaching place and time:** The program was implemented at the pediatric oncology department and pediatric oncology outpatient clinic (as mentioned in the setting) in a teaching class. The time was arranged according to the working time of the outpatient clinic and the oncology department.

**-Teaching methods and materials:** The researchers used lectures and discussion as a method of teaching and giving booklet handouts which were distributed to every mother at the beginning of the program.

**-Sessions:** Two sessions was carried out to implement the program: It was composed of teaching the mothers and their children the correct knowledge, and save practices, and positive attitude toward COVID-19 as: Definition, causative organism, incubation period, clinical manifestations, methods of transmission, treatment, prevention, steps of hand washing by soap/alcohol, sneezing etiquette to reduce infections, The correct way to wear a mask, social distancing, Cleaning and sterilization inside the house, definition of quarantine and isolation.... etc. The booklet contents were retrieved from the last updates in WHO websites and ministry of health.

**III. Implementation phase:** The educational program was performed during six months; two sessions for each mother for two days to complete the program contents.

**IV. Evaluation stage:** During this phase, the mothers' knowledge and knowledge about attitude and practice of mothers towards COVID-19 and in caring with their children were evaluated after two weeks of the pretest to appraise the effect of the educational program.

- **Fieldwork:** The data were collected from 1<sup>st</sup> of May to the end of October 2021 (six

months). The researchers met the studied mothers and their children at the teaching class at the mentioned setting. The researchers introduced themselves, explain the aim and nature of the study, and confirm the written acceptance to participate in the study. The Program was implemented through four sessions for each mother as the following: In the first session; the researchers were starting to collect the structured interview questionnaire (study tools) before program application. Then implementing the educational program as planned through two sessions; the second and third sessions (as mentioned in details in educational program above) for each mother using the program contents and contributed a handout booklet.

- After that the fourth session; it included the posttest. It was conducted after two weeks of the program implementation. About 2-3 mothers/day three days/week. About 30-45 minutes needed to fill the questionnaire for each mother before or/and after the program application. The researchers prepared the handout booklet and printed in color, it was included pictures, posters, PowerPoint presentation, and covered all contents about COVID-19 with updated references.

#### **Statistical analysis:**

The data were tested for normality using the Anderson-Darling test and for homogeneity variances prior to further statistical analysis. Categorical variables were described by **number and percent**, where continuous variables described by mean and standard deviation (**Mean, SD**). **Chi-square test** and fisher exact test used to compare between categorical variables where compare between continuous variables by **t-test** and **ANOVA TEST**. Person Correlation used for the association between scores. **A two-tailed  $p < 0.05$**  was considered statistically significant. All analyses were performed with the **IBM SPSS 20.0** software.

#### **Results:**

**Table (1):** Presents that 45.0% of the mothers were less than 30 years (mean age:  $35.22 \pm 9.32$ ). Likewise, 70.0% of them were resides in rural areas and 56.7% were illiterate. Correspondingly, the results found that 25.8 % of mothers had chronic diseases and 44.2 % had from 1-2 children. Regarding children; 43.3 % of the children were less than 5 years and 72.5 % of them were males. Also, the duration of illness was less than one year in 50.0% of the children.

**Figure (1):** Reveals that 53.4% of children were diagnosed with leukemia. While 26.7% had sarcomas (soft tissue cancer in the chest, lung, head & neck and around the eyes). Whereas; 5.8 % had osteosarcoma, lymphoma

and Wilms tumor respectively. Also, 2.5% of them had abdominal tumors.

**Figure (2):** Detects that 13.3% of the studied mothers had a good score before program application increased to 95.0% after program application with a highly statistically significant difference ( $p < 0.001^{**}$ ).

**Figure (3):** Clarifies that 55.8% of the mothers had satisfactory knowledge about attitude and practice level before the program application which reached 98.3% after program application with a highly statistically significant difference ( $p < 0.001^{**}$ ).

**Figure (4):** Demonstrates that 18.3 % of the mothers had satisfactory knowledge about attitude and practice level before the program application which reached 100.0% after program application with a highly statistically significant difference ( $p < 0.001^{**}$ ).

**Table (2):** Demonstrates that there was a statistically positive correlation between mothers' knowledge with their knowledge about attitude and practice toward COVID-19 before and after program application ( $r = 0.480$   $p = 0.000^{**}$  and  $r = 0.198$   $p = 0.030^{*}$  respectively). Also, a positive correlation was found as regards mothers' knowledge and their knowledge about attitude and practice toward COVID-19 with their children before and after program application ( $r = 0.195$   $p = 0.033^{*}$  and  $r = 0.206$   $p = 0.024^{*}$  respectively).

**Table (3):** Shows that statistically significant differences were detected between the mothers' knowledge regarding COVID-19 and their demographic data before program

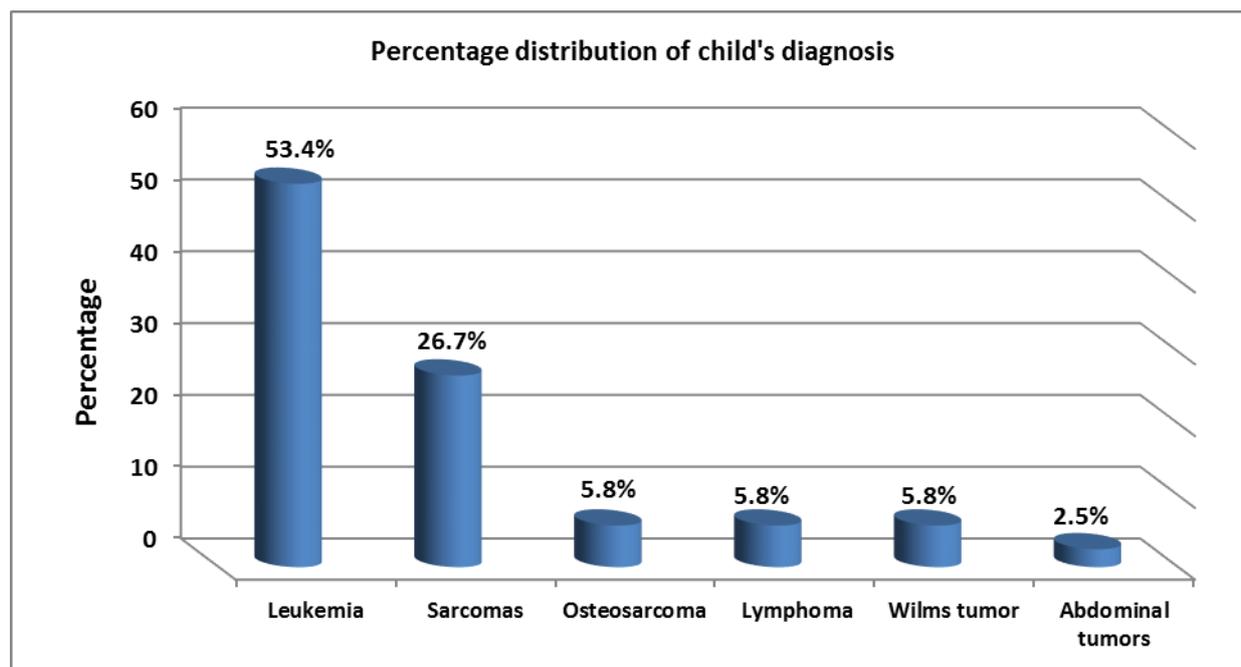
application as regards residence, education, and presence of chronic disease ( $P = 0.001^{**}$ ,  $< 0.001^{**}$ ,  $0.037^{*}$  respectively). While highly statistically significant differences were detected as regards all demographic data after educational program application ( $P = 0.0000^{**}$ ).

**Table (4):** Indicates that statistically significant differences were detected between mothers' knowledge about attitude and practice toward COVID-19 and their demographic data before educational program application as regards mothers' age, residence, education, presence of chronic disease, and children's number ( $P = 0.021^{*}$ ,  $0.018^{*}$ ,  $0.001^{**}$ ,  $< 0.001^{**}$ ,  $0.023^{*}$  respectively). While statistically significant differences were detected as regards residence and presence of chronic disease after educational program application ( $P = 0.029^{*}$  and  $0.016^{*}$ ).

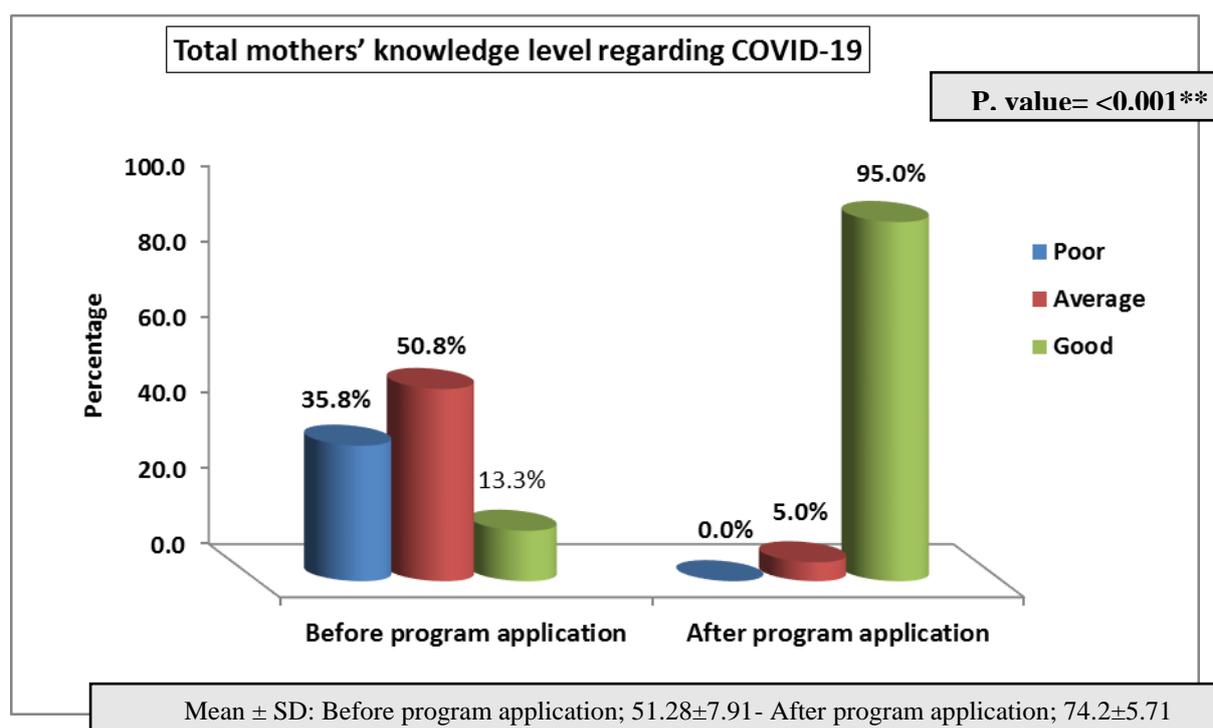
**Table (5):** Exhibits that statistically significant differences were detected between knowledge about mothers' attitude and practice toward COVID-19 with their children and their demographic data before educational program application as regards their age, residence, education, and presence of chronic disease ( $p = 0.031^{*}$ ,  $0.003^{**}$ ,  $0.036^{*}$ ,  $0.046^{*}$  respectively). While a highly statistically significant difference was detected as regards children's number only after educational program application ( $p = 0.007^{**}$ ).

**Table (1):** Distribution of characteristic data of the mothers and their children (n=120)

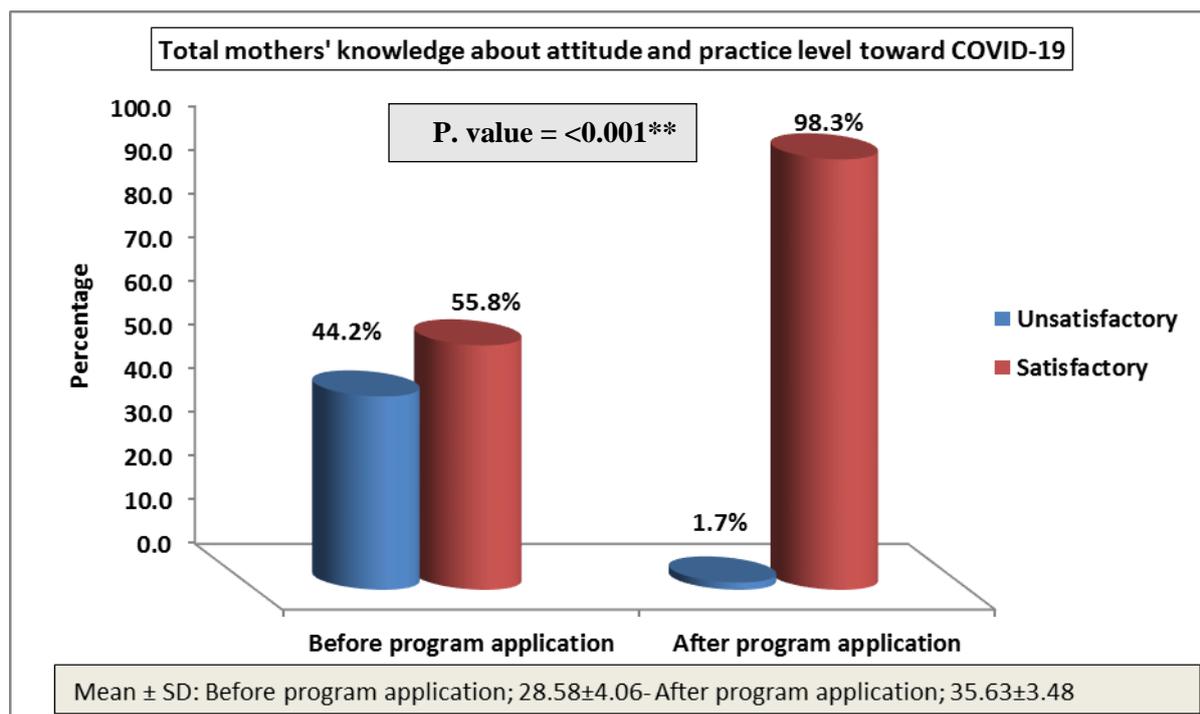
Characteristic data	No	%
<b>Mothers' age:</b>		
• Less than 30 years	54	45.0
• From 30-40 years	28	23.3
• More than 40 years	38	31.7
<b>Mean ± SD (range)</b>	<b>35.22±9.32 (20-50)</b>	
<b>Residence:</b>		
• Rural	84	70.0
• Urban	36	30.0
<b>Education:</b>		
• Illiterate	68	56.7
• Basic education	44	36.7
• Secondary education	8	6.7
<b>Do you suffer from any chronic diseases?</b>		
• Yes	31	25.8
• No	89	74.2
<b>If yes: What's diagnosis? (n=31)</b>		
• Breast cancer	5	4.2
• Diabetes mellitus	2	1.7
• Hypertension	9	7.5
• Diabetes mellitus & hypertension	12	10.0
• Heart disease	3	2.5
<b>Children's number:</b>		
• From 1-2	53	44.2
• From 3-4	43	35.8
• More than 5	24	20.0
<b>Mean ± SD (range)</b>	<b>3.94±1.8 (1-8)</b>	
<b>Child's age:</b>		
Less than 5 years	52	43.3
From 5-10 years	41	34.2
More than 10 years	27	22.5
<b>Mean ± SD (range)</b>	<b>7.1±4.08 (1.5-18)</b>	
<b>Child's gender:</b>		
• Male	87	72.5
• Female	33	27.5
<b>Duration of children's illness:</b>		
• Less than one year	60	50.0
• From 1-3 years	42	35.0
• More than 3 years	18	15.0



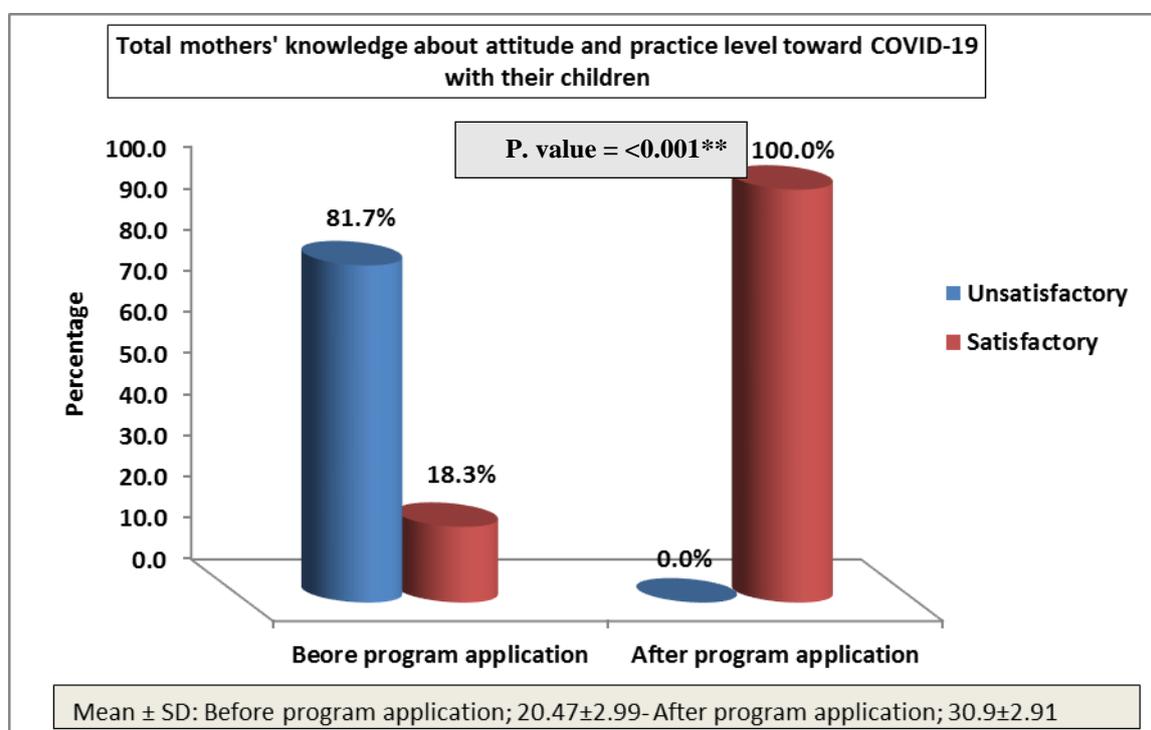
**Figure (1):** Percentage distribution of child's diagnosis (n=120)



**Figure (2):** Total mothers' knowledge level regarding COVID-19 before and after program application (n=120)



**Figure (3):** Total mothers' knowledge about attitude and practice level toward COVID-19 before and after program application (n=120)



**Figure (4):** Total mothers' knowledge about attitude and practice level toward COVID-19 with their children before and after program application (n=120)

**Table (2):** Correlation between mothers' knowledge regarding COVID-19 with their knowledge about attitude and practice towards COVID-19 and toward COVID-19 with their children before and after program application (n=120)

Correlations	Mothers' knowledge regarding COVID-19			
	Before program application		After program application	
	r	P	r	P
knowledge about attitude and practice towards COVID19	0.480	0.000**	0.198	0.030*
knowledge about attitude and practice of mothers towards COVID19 with their children	0.195	0.033*	0.206	0.024*

\* *Statistically Significant correlation at P. value <0.05*

\*\* *Statistically Significant correlation at P. value <0.01*

**Table (3):** Mothers' knowledge regarding COVID-19 in relation with characteristic data before and after program application (n=120)

Characteristic data	Mothers' knowledge regarding COVID-19							
	Before program application				After program application			
	Poor (N=43)	Fair (N=61)	Good (N=16)	P. value	Poor (N=0)	Fair (N=6)	Good (N=114)	P. value
	No (%)	No (%)	No (%)		No (%)	No (%)	No (%)	
<b>Mothers' age:</b>								
• Less than 30 years	17(39.5)	28(45.9)	9(56.3)	0.462	0 (0.0)	2(33.3)	52(45.6)	0.0000**
• From 30-40 years	9(20.9)	17(27.9)	2(12.5)		0 (0.0)	0(0)	28(24.6)	
• More than 40 years	17(39.5)	16(26.2)	5(31.3)		0 (0.0)	4(66.7)	34(29.8)	
<b>Residence:</b>								
• Rural	30(69.8)	49(80.3)	5(31.3)	0.001**	0 (0.0)	4(66.7)	80(70.2)	0.0000**
• Urban	13(30.2)	12(19.7)	11(68.8)		0 (0.0)	2(33.3)	34(29.8)	
<b>Education:</b>								
• Illiterate	32(74.4)	36(59)	0(0)	<0.001**	0 (0.0)	4(66.7)	64(56.1)	0.0000**
• Basic education	6(14)	22(36.1)	16(100)		0 (0.0)	2(33.3)	42(36.8)	
• Secondary education	5(11.6)	3(4.9)	0 (0)		0 (0.0)	0(0)	8(7)	
<b>Presence of chronic disease:</b>								
• Yes	17(39.5)	11(18)	3(18.8)	0.037*	0 (0.0)	2(33.3)	29(25.4)	0.0000**
• No	26(60.5)	50(82)	13(81.3)		0 (0.0)	4(66.7)	85(74.6)	
<b>Children's number:</b>								
• 1-2 children	17(39.5)	25(41)	11(68.8)	0.313	0 (0.0)	2(33.3)	51(44.7)	0.0000**
• From 3-4 children	16(37.2)	24(39.3)	3(18.8)		0 (0.0)	2(33.3)	41(36)	
• More than 5 children	10(23.3)	12(19.7)	2(12.5)		0 (0.0)	2(33.3)	22(19.3)	
<b>Child's age:</b>								
• Less than 5 years	22(51.2)	23(37.7)	7(43.8)	0.529	0 (0.0)	0(0)	52(45.6)	0.0000**
• From 5-10 years	12(27.9)	22(36.1)	7(43.8)		0 (0.0)	4(66.7)	37(32.5)	
• More than 10 years	9(20.9)	16(26.2)	2(12.5)		0 (0.0)	2(33.3)	25(21.9)	
<b>Child's gender:</b>								
• Male	32(74.4)	45(73.8)	10(62.5)	0.628	0 (0.0)	2(33.3)	85(74.6)	0.0000**
• Female	11(25.6)	16(26.2)	6(37.5)		0 (0.0)	4(66.7)	29(25.4)	
<b>Duration of children's illness</b>								
• Less than one year	20(46.5)	30(49.2)	10(62.5)	0.387	0 (0.0)	0(0)	60(52.6)	0.041
• From 1-3 years	14(32.6)	22(36.1)	6(37.5)		0 (0.0)	4(66.7)	38(33.3)	
• More than 3 years	9(20.9)	9(14.8)	0(0)		0 (0.0)	2(33.3)	16(14)	

*Chi square test for qualitative data between the two groups or more*

*\*Significant level at P value < 0.05, \*\*Significant level at P value < 0.01*

**Table (4):** Knowledge about mothers' attitude and practice toward COVID-19 in relation with characteristic data before and after program application (n=120)

Characteristic data	Knowledge about mothers' attitude and practice toward COVID-19					
	Before application			After application		P. value
	Unsatisfactory (N=53)	Satisfactory (N=67)	P. value	Unsatisfactory (N=2)	Satisfactory (N=118)	
	No (%)	No (%)		No (%)	No (%)	
<b>Mothers' age:</b>						
• Less than 30 years	17(32.1)	37(55.2)	0.021*	0(0)	54(45.8)	0.111
• From 30-40 years	13(24.5)	15(22.4)		0(0)	28(23.7)	
• More than 40 years	23(43.4)	15(22.4)		2(100)	36(30.5)	
<b>Residence:</b>						
• Rural	43(81.1)	41(61.2)	0.018*	0(0)	84(71.2)	0.029*
• Urban	10(18.9)	26(38.8)		2(100)	34(28.8)	
<b>Education:</b>						
• Illiterate	40(75.5)	28(41.8)	0.001**	0(0)	68(57.6)	0.173
• Basic education	10(18.9)	34(50.7)		2(100)	42(35.6)	
• Secondary education	3(5.7)	5(7.5)		0(0)	8(6.8)	
<b>Presence of chronic disease:</b>						
• Yes	22(41.5)	9(13.4)	<0.001**	2(100)	29(24.6)	0.016*
• No	31(58.5)	58(86.6)		0(0)	89(75.4)	
<b>Children's number:</b>						
• 1-2 children	16(30.2)	37(55.2)	0.023*	2(100)	51(43.2)	0.276
• From 3-4 children	24(45.3)	19(28.4)		0(0)	43(36.4)	
• More than 5 children	13(24.5)	11(16.4)		0(0)	24(20.3)	
<b>Child's age:</b>						
• Less than 5 years	28(52.8)	24(35.8)	0.102	2(100)	50(42.4)	0.265
• From 5-10 years	13(24.5)	28(41.8)		0(0)	41(34.7)	
• More than 10 years	12(22.6)	15(22.4)		0(0)	27(22.9)	
<b>Child's gender:</b>						
• Male	41(77.4)	46(68.7)	0.289	2(100)	85(72)	0.380
• Female	12(22.6)	21(31.3)		0(0)	33(28)	
<b>Duration of children's illness</b>						
• Less than one year	24(45.3)	36(53.7)	0.033	2(100)	58(49.2)	0.362
• From 1-3 years	16(30.2)	26(38.8)		0(0)	42(35.6)	
• More than 3 years	13(24.5)	5(7.5)		0(0)	18(15.3)	

**Chi square test for qualitative data between the two groups or more**

**\*Significant level at P value < 0.05, \*\*Significant level at P value < 0.01**

**Table (5):** Knowledge about mothers' attitude and practice toward COVID-19 with their children in relation with characteristic data before and after program application (n=120)

Characteristic data	N	Knowledge about mothers' attitude and practice toward COVID-19 with their children	
		Before application	After application
		Mean $\pm$ SD	Mean $\pm$ SD
<b>Mothers' age:</b>			
• Less than 30 years	54	21.07 $\pm$ 3.35	30.26 $\pm$ 2.38
• From 30-40 years	28	19.25 $\pm$ 2.38	31.46 $\pm$ 3.85
• More than 40 years	38	20.5 $\pm$ 2.61	31.39 $\pm$ 2.68
<b>P. value</b>		<b>0.031*</b>	<b>0.091</b>
<b>Residence:</b>			
• Rural	84	19.94 $\pm$ 2.93	30.87 $\pm$ 2.99
• Urban	36	21.69 $\pm$ 2.79	30.97 $\pm$ 2.76
<b>P. value</b>		<b>0.003**</b>	<b>0.860</b>
<b>Education:</b>			
• Illiterate	68	19.87 $\pm$ 2.85	30.84 $\pm$ 2.7
• Basic education	44	21.34 $\pm$ 3.24	31.11 $\pm$ 3.31
• Secondary education	8	20.75 $\pm$ 1.04	30.25 $\pm$ 2.49
<b>P. value</b>		<b>0.036*</b>	<b>0.720</b>
<b>Presence of chronic disease:</b>			
• Yes	31	19.55 $\pm$ 2.61	30.52 $\pm$ 2.79
• No	89	20.79 $\pm$ 3.06	31.03 $\pm$ 2.95
<b>P. value</b>		<b>0.046*</b>	<b>0.396</b>
<b>Children's number:</b>			
• 1-2 children	53	21.04 $\pm$ 3.11	30.58 $\pm$ 2.66
• From 3-4 children	43	19.95 $\pm$ 2.8	30.37 $\pm$ 2.94
• More than 5 children	24	20.13 $\pm$ 2.94	32.54 $\pm$ 2.9
<b>P. value</b>		<b>0.173</b>	<b>0.007**</b>
<b>Child's age:</b>			
• Less than 5 years	52	20.4 $\pm$ 3.27	30.81 $\pm$ 2.73
• From 5-10 years	41	20.49 $\pm$ 2.8	30.88 $\pm$ 3.12
• More than 10 years	27	20.56 $\pm$ 2.78	31.11 $\pm$ 3.02
<b>P. value</b>		<b>0.976</b>	<b>0.908</b>
<b>Child's gender:</b>			
• Male	87	20.79 $\pm$ 3.2	31.01 $\pm$ 2.94
• Female	33	19.61 $\pm$ 2.15	30.61 $\pm$ 2.86
<b>P. value</b>		<b>0.052</b>	<b>0.498</b>
<b>Duration of children's illness:</b>			
Less than one year	60	20.72 $\pm$ 2.6	30.87 $\pm$ 3.36
From 1-3 years	42	20.5 $\pm$ 3.37	30.67 $\pm$ 2.42
More than 3 years	18	19.56 $\pm$ 3.24	31.56 $\pm$ 2.31
<b>P. value</b>		<b>0.353</b>	<b>0.555</b>

- Independent T-test quantitative data between the two groups,

- One-way Anova T-test quantitative data between the three groups or more

## Discussion:

The sudden outbreak of the novel coronavirus pandemic resulted in an enormous impact on children's health worldwide. The recurrent nature and high infectiousness of COVID-19 led many countries around the world to announce the importance of protective measures, especially for children with cancer. Researchers have repeatedly stressed the importance of mothers' roles as the frontline in providing care to their children. Mothers are encouraged to focus on the promotion of good health behaviors for their children with cancer (**Koo, 2020 and Lee, 2020**).

The present study aimed to evaluate the effect of educational program for mothers of children with pediatric oncology regarding COVID-19 knowledge, attitudes, and practices.

The present study showed that near half of mothers were less than 30 years. Likewise, more than two-thirds of them were resides in rural areas and more than half were illiterate. Correspondingly, the results found that more than one-quarter of mothers had chronic diseases and more than two-fifths had from 1-2 children.

Regarding children data; it was found that more than two-fifths of them were less than 5 years and the majority was male. Also,

the duration of illness was less than one year in half of them. Moreover, the findings revealed that more than half of children were diagnosed with leukemia. While more than one-quarter had sarcomas (soft tissue cancer in the chest, lung, head & neck and around the eyes). Whereas, less than one-tenth had osteosarcoma, lymphoma, Wilms tumor and abdominal tumors respectively.

**The current study findings disclosed** that low percentage of the studied mothers had a good score of knowledge regarding COVID-19 before program application which significantly increased to the majority of mothers after the program application. The researchers viewed that this incomplete awareness before the program may be attributed to the new occurrence of the disease and rapid spread around the world as well as knowledge gaps gained from social media and the shortage of health education campaigns related to COVID -19. Correspondingly, the result could be explained that the planned educational program would enhanced the mothers' knowledge regarding different health problems such as COVID-19. In the same line **Goni et al., (2019)** reported that participants had good score of knowledge. These findings agreed with **Joshi et al., (2020)** who reported that three -quarters of the studied sample presented good knowledge and awareness about COVID-19 post educational

program. Also, **Zhong et al., (2020)** conducted a rapid web-based cross-sectional study in china to evaluate the attitude and awareness regarding COVID-19 at the epidemic's peak; and reported that the studied sample was more knowledgeable and had optimistic attitudes after interventions.

In addition, the result was in line with **Abdeldaim and Elghazally, (2021)** who found that there was an improvement in knowledge and practices after implementing an educational session. Meanwhile, the current study disagreed with **Al-Hanawi et al., (2020)**, **Ali et al., (2020)** and **Chen et al, (2021)** they concluded that the majority of the study participants were knowledgeable about COVID-19.

The current study reported that a low percentage of the mothers had satisfactory knowledge about attitudes and practice levels regarding COVID-19 and COVID-19 with their children before the program application which significantly reached the majority after the program application. This finding was due to a lack of health intervention programs applied to the mothers and a lack of awareness among mothers about COVID-19's practices and attitudes. Also, the researchers explained that the planned educational intervention would positively increase the mothers' practices and attitudes during care of their children. The study finding was in the same

line with **Al-Dossary et al, (2020)** who stated that higher preventive practices in dealing with COVID-19 post-intervention. Likewise, **Alzoubi et al, (2020)** found that higher levels of practice towards the disease protective measures were acquired after the intervention. But this result was in contrast with **Adesegun et al, (2020)** who reported that more than three-quarters of the respondents had good practices and **Chen et al, (2021)** cleared that the majority of the sample had satisfactory practices pre-intervention.

The current study revealed that there was a statistically positive correlation between mothers' knowledge with their knowledge about attitude and practice toward COVID-19 and toward COVID-19 with their children before and after program application. The researchers viewed that educational programs, mass media and governmental efforts are an excellent tool to increase public awareness regarding COVID-19 and provide a more optimistic attitude and practices. Also good awareness precipitates good preventive attitude and practices. Our finding was in the same line with **Mbachu, et al, (2020)** who indicated that there was a significant correlation between knowledge and practice and implies that knowledge of all studied sample should be improved to enhance the use of preventive practices.

Concerning the current findings; there were statistically significant association between personal data and mothers' knowledge before program application as regards residence, education and presence of chronic diseases, with statistically significant differences as regards all demographic data after educational program application. These results agreed with **Said et al, (2020)** who performed an educational program during COVID-19 and found that there was highly statistically significant positive relation between knowledge and education pre and post program. Moreover this finding was agree with **Kasemy et al, (2020)** stated that there was a significant difference between age and education with the total score of practice.

On the other hand, results of **Kamineni, et al, (2020)**, **Ngwewondo et al, (2020)** and **Nemati, et al, (2020)** didn't match the current findings which found that the total knowledge score was not affected by educational level and it was not significantly different between participated samples. Likewise, contradicted with **Amanya, et al, (2020)** who reported that personal characteristics as educational level had no statistically significant relation with Covid-19 practices. Also, **Singh and Ahuja, (2020)** who carried a study in India to assess knowledge, attitude and practice towards COVID-19 and found that there was not a significant

difference between knowledge score with age. This can be attributed to that poor knowledge was prevalent among all age groups or/and educational levels due to the novelty of the pandemic and scarcity of available knowledge.

#### **Conclusion:**

The current study results revealed that the mothers' knowledge significantly improved after the program application. Likewise, the mothers' knowledge about attitudes and practices toward COVID-19 changed positively and significantly enhanced after the educational program application.

#### **Recommendations:**

- Continued educational programs regarding COVID-19 help the mothers improve their knowledge, attitude and practice.
- Pediatric and oncology hospitals should offer the mothers handouts, brochures, posters, or videotapes about COVID-19.
- Using mass media to spread the correct information about COVID-19 and to increase mothers' awareness about its harmful effect on their children's health.
- Certain efforts must be placed on the completion of personal protective measures which are necessary to decrease the COVID-19 exposure of mothers and their children.

- Further researches for generalization of results should be conducted on larger sample size.

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