

Effect of Educational Program on Nurses' Competency Regarding Providing Palliative Care for Children with Advanced Stage of Cancer

*Samar Abd-Elrahman Abd-Elrahman Radwan¹, Sahar Mahmoud El-Khedr Abd-Elgawad²,
Amal Abo-El-Azm Abd El-Rahman Younis³*

¹ *Demonstrator of Pediatric Nursing, Faculty of Nursing/ Tanta University, Egypt.*

² *Professor of Pediatric Nursing, Faculty of Nursing/ Tanta University, Egypt.*

³ *Lecturer of Pediatric Nursing, Faculty of Nursing/ Tanta University, Egypt.*

Abstract

Background: Childhood cancer is a major stressful experience facing children. Application of pediatric palliative care encompasses physical, psychological, spiritual health of children with cancer and their family. Competency in palliative care focused on knowledge of palliative care, personal qualities and attributes and key skills to fulfill professional responsibility through practice. **The current study aims** to evaluate the effect of educational program on nurses' competency regarding providing palliative care for children with advanced stage of cancer.

Research design: A quasi experimental research design was used. **Subjects and method:** A convenience sampling of forty- five nurses working at Pediatric Hematology and Oncology Unit at Tanta main University Hospital and Tanta cancer center affiliated to Ministry of health and population were recruited in the current study. **Two Tools were used to collect data:** First tool is Structured Questionnaire Schedule to assess socio demographic characteristic and nurses' knowledge regarding childhood cancer and palliative care. Second tool is Palliative Care Competency checklist. **The results of the present study** revealed that the total score of nurses' knowledge had improved immediately and one month after implementing educational program. Statistical significant differences were found regarding all competency domain before, immediately and one month after implementing the educational program. **The study concluded** improvement of nurses' knowledge and competencies regarding providing palliative care for children with advanced stage of cancer. **The study recommended** applying competency based nursing intervention to children with advanced cancer and developing an educational program for parents.

Keywords: Advanced stage of cancer, Children, Educational program, Nurses' competency, Palliative care.

Introduction

Cancer is defined as a group of diseases in which there is uncontrolled growth and spread of abnormal cells and ultimately may result in death. Childhood cancer is a general term used to describe a range of cancerous and non-cancerous tumors found in children and may also called pediatric cancer.⁽¹⁾

Advanced cancer is a term used to describe cancer that is unlikely to be cured, but it can be controlled. It is occasionally called a chronic or long-lasting disease.⁽²⁾ Cancer is considered the second-leading cause of death among children ages 1-14 years after accidents. In 2021, it is estimated that 15,590 children and adolescents ages 0 to 19 years old were diagnosed with cancer and 1,780 died of the disease in the United States (US).⁽³⁾ According to national cancer registry program of Egypt, an overall 4,366 children with cancer were recorded from 2016 till the end of 2017.⁽⁴⁾

Causes of childhood cancer are slightly known but there are many predisposing factors that may lead to it.⁽⁵⁾ The most common types of

cancers that prevail in children are leukemia, Neuroblastoma, wilms tumor, Non-Hodgkin lymphoma and Hodgkin lymphoma.⁽⁶⁾ Treatment modalities include surgery, radiation therapy, chemotherapy, stem cell transplants and targeted therapy that attack specific cancer cells causing minimal harm to normal cells by using specific drugs or other substances.⁽⁷⁾

Pediatric palliative care is defined as an active and total approach to care, embracing physical, emotional, social, and spiritual elements. It focuses on enhancement of quality of life for the child and support for the family and includes management of distressing symptoms, provision of respite and care through disease, death and bereavement.^(8, 9) Providing palliative care to children with advanced cancer should be started as early as possible when cancer is firstly diagnosed regardless it's type or stage. Team approach of palliative care include palliative care consultant, general practitioners, and specialist nurse. In addition to; physiotherapy, speech and language therapy,

occupational therapy, nutritionist and dietetics, social workers besides respiratory care specialist.⁽¹⁰⁾

The roles of palliative care team include ongoing assessment of symptoms and integration of symptom control protocols to enable children to stay at home besides inpatient care for children with aggressive symptoms that cannot be adequately controlled at home and require more care, referral of children with severe symptoms to higher-level hospitals as well as training and supervision of the staff who provide palliative care at community health centers.^(10, 11)

Nursing competency can be defined as nurse's ability to effectively demonstrate a set of attributes, such as personal characteristics, professional attitude, values, knowledge and skills and to fulfill professional responsibility through practice. Palliative care specialist nurses must have the basic knowledge and competency skills to assist children to have a normal life and a normal dying process and to be able to address all needs of children

with advanced cancer and their families.⁽¹²⁾

Significance of the study:

There is a clear need for a comprehensive pediatric palliative care strategy to support children with advanced cancer and their families. Previous studies found that, nurses have lacked knowledge and skills in providing palliative care for those children.⁽¹³⁾ The deficit in knowledge and skills underscore the need to promote knowledge and skills through continuing education and improving competencies related to palliative care practice.⁽¹⁴⁾ Hence, it is important to conduct an educational program for nurses about the pediatric palliative care to enhance their knowledge and competencies that could help children receive high quality competency based intervention that help them and their families to receive support through a difficult time.^(15,16)

Aim of the study

The aim of this study was to: evaluate the effect of educational program on nurses' competency regarding providing palliative care for children with advanced stage of cancer.

Research hypothesis: Nurses' competency is expected to be improved after receiving the educational program regarding providing palliative care for children with advanced stage of cancer.

Subjects and Method

A quasi-experimental research design was used in the present study. The study was conducted at Pediatric Hematology Unit at Tanta Main University Hospital and Tanta cancer center which Affiliated to the Ministry of Health and Population.

Sample: All nurses who are working in the previously mentioned settings during the study period (30 nurses working at Pediatric Hematology and Oncology Unit and 15 nurses from Tanta Cancer Center).The studied nurses are working with children aged 4-15 years, both sexes who are suffering from cancer.

Two tools were used in the current study as follow:

Tool I: Structured Questionnaire Schedule:

It was developed by the researcher after reviewing of recent and related literature ^(1,17,18) to assess nurses'

knowledge before, immediately and one month after the educational program implementation. It was consisted of two parts:

Part (1) Socio-demographic characteristics of studied nurses:

Including nurses' age, sex, residence, educational level, working department, years of experience in oncology department, and previous training programs.

Part (2) Nurses' knowledge regarding childhood cancer and palliative care:

It included data related to definition of cancer, common manifestation, sedation or opioid used for pain management, Palliative care definition, aim, purposes and principles, best time to integrate palliative care into child line of treatment, role of pediatric palliative care nurse, nursing interventions to relieve cancer pain, nausea and vomiting, and dyspnea, nursing interventions to improve psychological and spiritual health of children with advanced stage of cancer.

Scoring system:

Questionnaire sheet contained 14 questions; each question was scored

from (0-2 grades). The correct and complete answer was scored (2), while correct and incomplete answer was scored (1), and wrong or don't known answers were scored (0).

The total score of Nurses' knowledge was calculated and classified into

- High level of knowledge considered from 80% and more.
- Moderate level of knowledge considered from 60 > 80%.
- Low level of knowledge considered less than 60%.

Tool II: Palliative Care Competency checklist:

It was developed by the researcher based on Palliative care competency framework ⁽¹⁹⁾and Nurse's Core Competency in Palliative Care Scale ⁽²⁰⁾. It was used to evaluate nurses' competencies regarding palliative care before, immediately after and one month after implementing the educational program. This tool was used for nurses to self-report their nursing practice in relation to professional competency regarding palliative care. It included six core competency domains which are

principles of palliative care domain, communication domain, optimizing comfort and quality of life domain, care planning and collaborative practice domain, loss, grief, and bereavement domain and professional and ethical practice domain.

Scoring system:

Scoring system for nurses' competency by using Palliative care competency framework which consisted of (61 items); each item was scored by using a likert scale from 1 to 3 in which never was scored 1, sometimes was scored 2 and always was scored 3.

The total score for nurses' competency was calculated and classified as follow:

- The total score $\geq 80\%$ meant that, nurses are competent in palliative care.
- The total score $< 80\%$ meant that, nurses are incompetent in palliative care.

Method

The study was accomplished through the following steps:

1-Administrative process: An official permission was obtained from the dean of the Faculty of Nursing, Tanta University directed to administrators of Pediatric Hematology Unit at Tanta University Hospital and Tanta Cancer Center to obtain their approval and cooperation for carrying out this study.

2-Ethical and legal considerations: Ethical approval to conduct the study was taken from ethical committee at the faculty of Nursing, Tanta University. Nurses were informed about the confidentiality of the information obtained from them. The nature of the study didn't cause any harm or pain to the entire sample. Nurses' informed consents to participate in this study were obtained after explanation of the aim and benefits of the current study. The nurses had the right to withdraw from the study at any time. Ethical committee approval was obtained

3- Tools Development: Study tools (I & II) were developed by the researcher after reviewing of recent literatures. ^(1,17-21)

4-Content validity: The tools of the study were presented to a jury of five

experts in the field of Pediatric Nursing to check content validity and clarity of the questionnaire. Modifications were carried out accordingly. Content validity index = 98.5%.

5- Content reliability: The study tools were tested by the pilot subjects. The test of reliability (cronbach's alpha) was 0.975 that indicates high reliability of the tools.

6- Pilot study: A pilot study was carried out on five nurses (10%) of the sample to test the tool for its clarity, applicability, feasibility and the necessary modifications were done. Pilot study was excluded from the total sample of the study.

Phases of the study: The study was conducted through four phases:

1.AssessmentPhase:It was carried out by the researcher for all study subjects to collect baseline data, and to assess nurses' knowledge related to palliative care provided to children with advanced cancer before, immediately and after one month from application of the program using Tool (I). Palliative care self-assessment checklist was filled by nurses before,

immediately and after one month from application of the program. The researcher was available 2 days per week alternatively in the previously mentioned settings using Tool (II).

2.PlanningPhase:

Educational intervention was developed after extensive review of the related literature. It was designed according to nurses' needs assessment which included the following:

- Setting objectives of the educational program.
- Preparation of the content which covered the reasons behind the application of the session.
- Preparation of suitable media as (lecture, video, power point presentations, printed booklet with illustrated pictures).
- Palliative care competency checklist was administered in Arabic language.

3.Implementation Phase:

- Before conducting the educational program, the researcher made need assessment (pretest) for each group separately using Tool (I) and Tool (II) and accordingly designed the plan for the educational sessions.

- The educational program was carried out for the studied nurses through conduction of successive educational sessions.

- Each session was started by feedback about the previous educational sessions' content and a summary about what had been discussed previously.

- Educational program was conducted in four sessions, twosessions / week. The time of each session was about 30-45 minutes including periods of discussion according to the nurses' progress and feedback.

- Different methods of teaching were used.

- The studied nurses were divided into nine groups; each group consisted of five nurses. Six groups from Hematology Pediatric Unit and three groups from Tanta cancer center.

- **The educational program sessions were carried out as follows:**

- a. **First session:** it focused on definition of advanced cancer, pediatric palliative care, patho-physiology, types and manifestations of childhood cancer, goals and principles of palliative care, causes of cancer pain in children and its management and the best time to

provide palliative care to children with advanced cancer.

- b. **Second session:** it focused on principles of palliative care a good communication skills.
- c. **Third session:** it focused on measures to optimize child's comfort, enhancing quality of his life and coordinating child's care.
- d. **Fourth session:** it focused on identifying impact of loss, grief and bereavement on child's family and siblings and address potential ethical issues that may be encountered.

4. Evaluation Phase: Evaluation of nurses' competency was carried out using the same tools. Each nurse was evaluated immediately after implementation of the educational program and one month later, and these two evaluations will be compared to pre-test data

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 23). For quantitative data, the range, mean and standard deviation were calculated. For

qualitative data, comparison between two groups and more was done using Chi-square test (χ^2) for comparison between more than two means of parametric data. Significance was adopted at $p < 0.05$ for interpretation of results of tests of significance.⁽²¹⁾

Results

Figure (1): It was evident that, nearly equal percentage of 26.7% of the studied nurses their age ranged between 30- < 40, 40-< 50, 50-< 60 years with mean age of (40.333 ± 11.457) years.

Figure (2): It was clear that, about two thirds (62.2%) of the studied nurses had nursing diplom, 22,2% had a technical nursing institute education , while 15.6 % of them had completed their university nursing education.

Figure (3): It was found that 20% and 24.4% of the studied nurses had 10- < 20 and 20 - < 30 years of experience respectively, while 26.7% and 28.9% had < 10 and 30- < 40 years of experience respectively. The mean years of experience were 19.267 ± 11.563 years.

Table(1): Shows total knowledge of the studied nurses' regarding cancer and palliative care. It was noticed that 62.2% and 26.7% had low level and moderate level of total knowledge respectively before the educational program compared to all nurses (100%) and 91.1% of them had high level of total knowledge immediately and one month after implementing the educational program respectively. There were highly statistical significant differences regarding nurses' knowledge between before and immediately, and one month after implementing the educational program ($P=0.0001$). Also, statistical significant difference was found in the mean score of knowledge before, immediate, and one month after implementing the educational program respectively.

Table(2): Illustrates the mean score of the studied nurses regarding palliative care competency domains before, immediately and one month after implementing the educational program. There was highly statistical significant difference regarding principles of palliative care domain ($P=0.0001$) with a high mean \pm SD

25.155 \pm 1.106 immediately after educational program and 24.555 \pm 1.323 one month later. Also, there was high statistical significant difference regarding communication domain of competency ($P=0.0001$) with mean \pm SD 12.777 \pm 3.502, 22.333 \pm 1.381 and 21.800 \pm 1.272 before, immediately and one month after implementing the educational program respectively.

Concerning to optimizing comfort and quality of life domain of competency, there was highly statistical significant difference ($P=0.0001$) with mean \pm SD 23.844 \pm 5.501, 40.844 \pm 2.255 and 40.022 \pm 2.137 before, immediately and one month after implementing the educational program respectively and 16.955 \pm 5.485, 29.422 \pm 1.959 and 28.555 \pm 2.607 respectively regarding care planning and collaborative practice. This table also shows that there was high statistical significant difference regarding loss, grief and bereavement domain of competency and professional and ethical practice in the context of palliative care domain of competency before, immediately and one month after implementing the educational program.

Percentages of nurses according to levels of palliative care competency before, immediately after, and one month after implementing the educational program was shown in **table (3)**. It was apparent that 86.7% weren't competent in providing palliative care before the educational program compared to 100% and 88.9% of the studied nurses who were competent in providing palliative care immediately and one month after implementing the educational program respectively. As regards mean competencies scores, before the educational program was 100.68 ± 22.82 compared to 166.64 ± 6.19 and 161.77 ± 7.71 immediately and one month after the implementing the educational program. There were high statistical significant differences in mean scores of nurses' competencies regarding palliative care before, immediately after and one month after implementing the educational program ($P=0.0001$).

Table(4): Reflects the correlation between nurses' socio-demographic data and total knowledge score before, immediate, and one month after the

program among the studied nurses regarding palliative care. It was clear that there were significant positive correlations between nurses' age and both educational level, and experience levels ($P=0.001$). Positive correlation was also found between educational level, working unit, and experience. Also, significant positive correlation was evident between nurses' total knowledge, educational level, working unit, and experience level before the program. This may be explained by educational level and experience at working unit affect nurses' total knowledge before the program, while immediately and one month after program, all nurses' total knowledge improved regardless educational and experience level.

Correlation between nurses' socio-demographic data and total competencies score before, immediate, and one month after the program regarding palliative care was presented in **table (5)**. It was observed that there were significant positive correlations between nurses' age and both educational and experience level. Also, there were significant positive

correlations between educational level and both working unit and experience. This means that with increased experience and improved age, the nurses gain experience and improved competencies. There was significant positive correlation between total nurses' competency and their age, working unit, and experience level before program implementation. While immediately and one month after program implementation, there was significant positive correlation between nurses' competency and age and experience level. Also, there was significant positive correlation between total competency immediately after and total competency one month after program implementation.

Table (6): Presents correlation between total nurses' knowledge and competencies score before, immediate, and one month after the program. It was apparent that there was significant positive correlation between total competency before and total knowledge before the implementation of the educational program. Positive correlation was also evident between total competency immediately after

and total competency one month after the educational program. It was clear that total competencies immediately after program had positive correlation with total competencies one month after and total knowledge score immediately after and one month later. Positive correlation also, found between total competencies and total knowledge one month after program implementation. This means that when nurses gain knowledge immediately and one month after the educational program then level of competence also improved

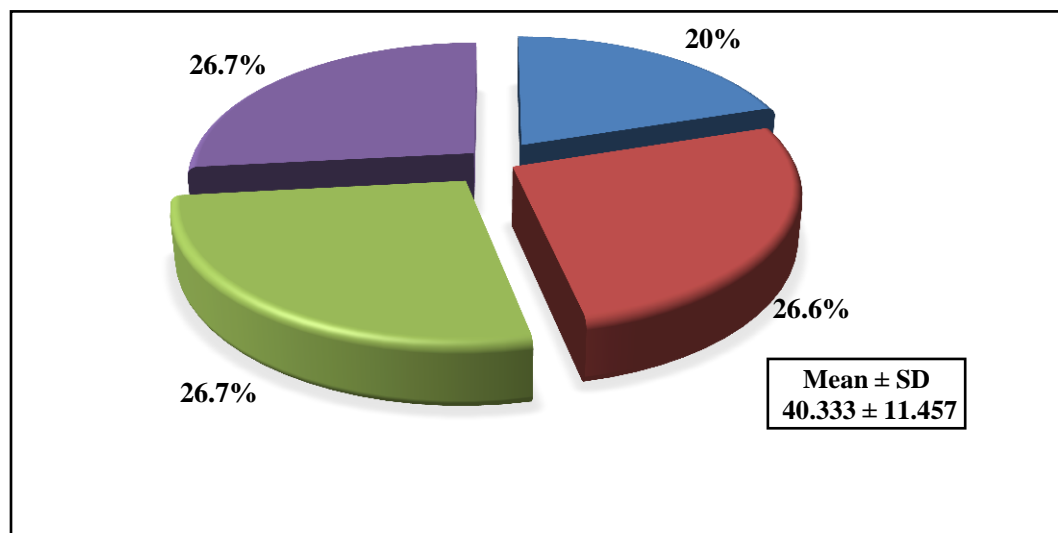


Figure (1): Percentage distribution of the studied nurses according to their age (n=45)

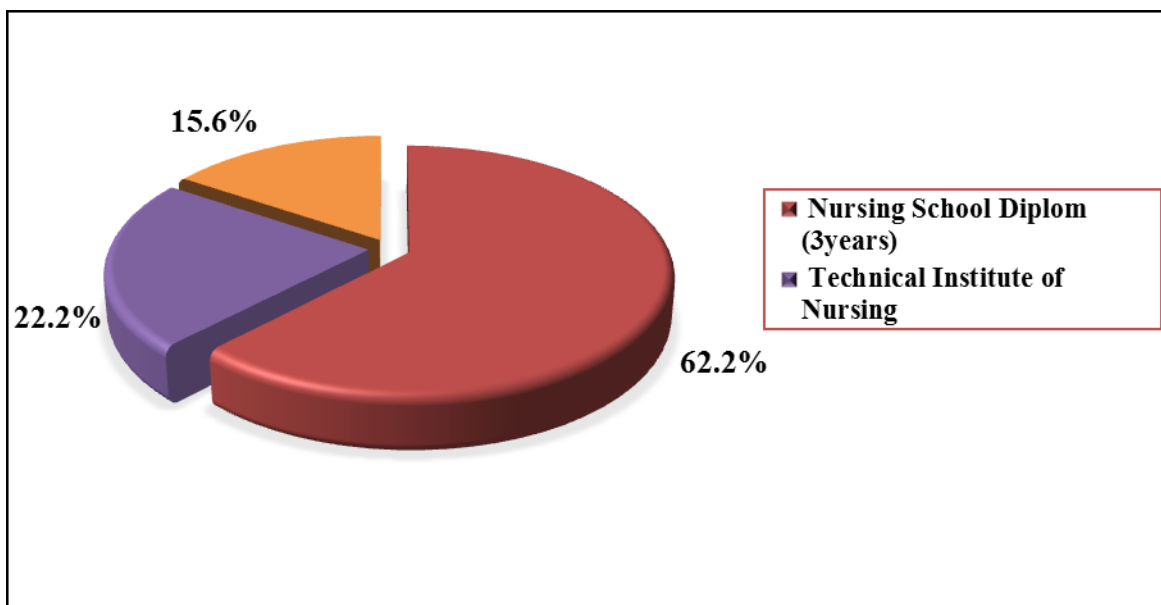


Figure (2):Percentage distribution of the studied nurses according to their educational level (n=45)

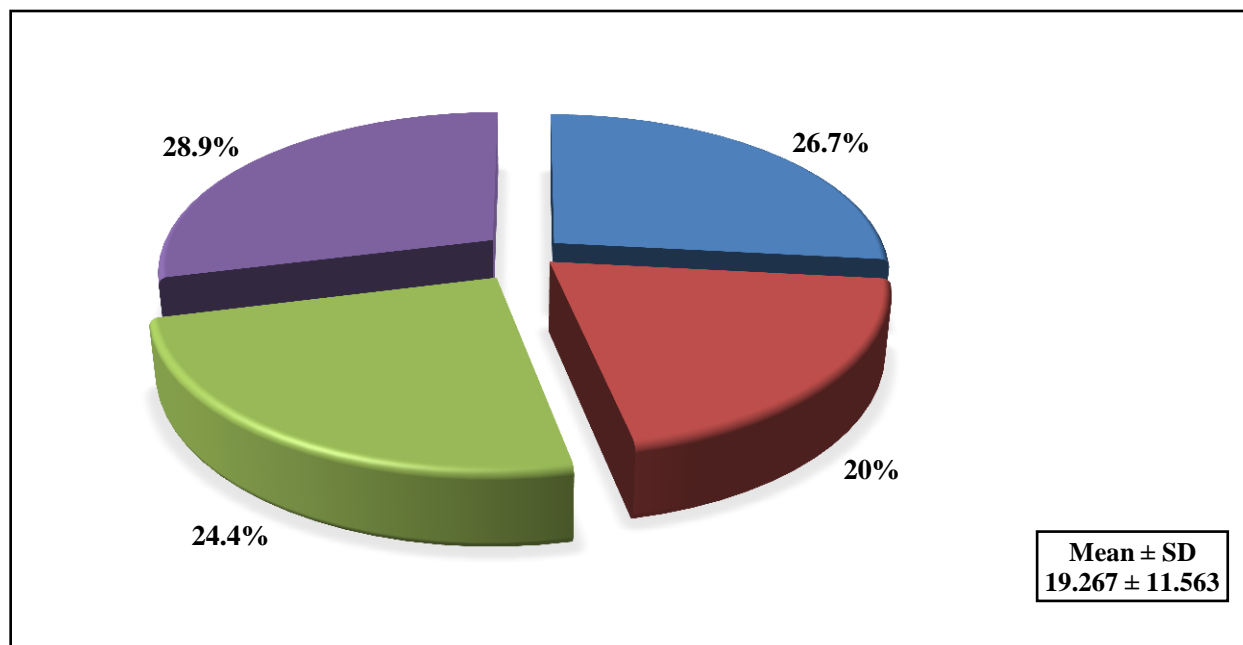


Figure (3):Percentage distribution of the studied nurses according to their experience in years (n=45)

Table (1): Total knowledge scores of the studied nurses regarding cancer and palliative care.

Levels of total knowledge	Before educational program (n=45)		Immediate after educational program (n=45)		One month after educational program (n=45)		I	II	III
	No	%	No	%	No	%	χ^2	χ^2	χ^2
							P	P	P
Low level of knowledge	28	62.2	0	0.0	0	0.0	72.000 0.0001**	60.174 0.0001**	4.186 0.041*
Moderate level of knowledge	12	26.7	0	0.0	4	8.9			
High level of knowledge	5	11.1	45	100.0	41	91.1			
Knowledge scores							F value		
Mean ± SD	16.533 ± 3.64		27.000 ± 1.27		25.111 ± 2.01		P		
							221.183 0.0001**		

*Statistically significant difference at (P<0.05)

** Highly statistically significant difference at (P<0.001)

- I Between before and immediate after

- II Between before and one month after

- III Between immediate and one month after

Table (2): Mean score of the studied nurses regarding palliative care competency domains.

Nurses' competency	The studied nurses (n=45)			F-value P
	Before educational program	Immediate after educational program	One month after educational program	
	Mean ± SD	Mean ± SD	Mean ± SD	
Principles of palliative care	11.733 ± 3.413	25.155 ± 1.106	24.555 ± 1.323	530.389 0.0001**
Communication	12.777 ± 3.502	22.333 ± 1.381	21.800 ± 1.272	246.430 0.0001**
Optimizing comfort and quality of life	23.844 ± 5.501	40.844 ± 2.255	40.022 ± 2.137	310.726 0.0001**
Care planning and collaborative practice	16.955 ± 5.485	29.422 ± 1.959	28.555 ± 2.607	160.615 0.0001**
Loss, grief and bereavement	15.933 ± 3.010	21.800 ± 1.560	21.266 ± 1.710	99.480 0.0001**
Professional and ethical practice in the context of palliative care	19.444 ± 4.595	27.088 ± 2.419	25.577 ± 3.633	55.074 0.0001**

****Highly statistically significant difference at (P<0.001)**

Table (3): Percentages and mean score of nurses regarding levels of palliative care competency.

Total nurses' competency regarding palliative care.	Before educational program (n=45)		Immediate after educational program (n=45)		One month after educational program (n=45)		I	II	III
	No	%	No	%	No	%	χ^2	χ^2	χ^2
							P	P	P
Competent	6	13.3	45	100.0	40	88.9	68.824 0.0001**	51.403 0.0001**	5.294 0.021*
Not competent	39	86.7	0	0.0	5	11.1			
Mean of nurses' competencies:							F value P		
Mean \pm SD	100.68 \pm 22.82		166.64 \pm 6.19		161.77 \pm 7.71		294.722 0.0001**		

*Statistically significant difference at (P<0.05)

** Highly statistically significant difference at (P<0.001)

- I Between before and immediate after
- II Between before and one month after
- III Between immediate and one month after

Table (4): Correlation matrix between nurses' socio-demographic data and total knowledge score before, immediate, and one month after the program (n=45)

Variables		Age	Educational level	Residence	Working unit	Experience level	Total knowledge score before	Total knowledge immediate after
Educational level	r	.642	-	-	-	-	-	-
	p	.0001*	-	-	-	-	-	-
Residence	r	.023	-.017	-	-	-	-	-
	p	.880	.909	-	-	-	-	-
Working unit	r	-.279	.504	.000	-	-	-	-
	p	.064	.0001**	1.000	-	-	-	-
Experience level	r	.947	.700	.077	.077	-	-	-
	p	.0001*	.0001**	.617	.617	-	-	-
Total knowledge score before	r	.155	.617	.101	.526	.256	-	-
	p	.308	.0001**	.507	.0001**	.0001**	-	-
Total knowledge immediate after	r	.079	.164	-.207	.224	.030	.175	-
	p	.525	.281	.173	.140	.844	.249	-
Total knowledge one month after	r	.043	.090	-.107	.055	.015	.174	.203
	p	.778	.555	.483	.719	.923	.252	.181

**Correlation is significant at the 0.001 level

*Correlation is significant at the 0.05 level

Table (5): Correlation matrix between nurses' socio-demographic data and total competencies score before, immediate, and one month after the program (n=45).

Variables		Age	Educational level	Residence	Working unit	Experience level	Total competencies score before	Total competencies score immediate after
Educational level	r	.642	-	-	-	-	-	-
	p	.0001**	-	-	-	-	-	-
Residence	r	.023	-.017	-	-	-	-	-
	p	.880	.909	-	-	-	-	-
Working unit	r	-.279	.504	.000	-	-	-	-
	p	.064	.0001**	1.000	-	-	-	-
Experience level	r	.947	.700	.077	-.350*	-	-	-
	p	.0001**	.0001**	.617	.018	-	-	-
Total competencies score before	r	.330	.769	-.038	.555	.411	-	-
	p	.023*	.0001**	.802	.0001**	.005*	-	-
Total competencies score immediate after	r	.397	.211	-.073	.064	.339	.005	-
	p	.007*	.165	.633	.676	.023*	.976	-
Total competencies score one month after	r	.300	.077	-.114	.166	.295	.127	.820
	p	.045*	.616	.456	.277	.049*	.406	.0001**

**Correlation is significant at the 0.001 level

Table (6): Correlation matrix between total nurses’ knowledge and competencies score before, immediate, and one month after the program (n=45).

Variables		Total competencies score before	Total competencies score immediate after	Total competencies score one month after	Total knowledge score before	Total knowledge immediate after
Total competencies score immediate after	r	.005	-	-	-	-
	p	.976	-	-	-	-
Total competencies score one month after	r	.127	.820	-	-	-
	p	.406	.0001**	-	-	-
Total knowledge score before	r	.825	.230	.250	-	-
	p	.0001**	.129	.098	-	-
Total knowledge immediate after	r	.287	.612	.111	.175	-
	p	.056	.001*	.467	.249	-
Total knowledge one month after	r	-.024	.511	.418	.174	.203
	p	.873	.0001**	.004*	.252	.181

** Correlation is significant at the 0.001 level

* Correlation is significant at the 0.05 level

Discussion

Cancer is a term that describe a group of diseases in which abnormal cells divide without control, invade nearby tissues and spread to other parts of the body through the blood and lymph systems. The most common childhood cancers are leukemia, brain and other central nervous system tumors and lymphoma. More children cure cancer now than ever before due to new and better treatment modalities. One of these modalities is called palliative care.⁽²²⁾

Pediatric palliative care is an emerging medical specialty that based on multidisciplinary team in nature and including medicine, nursing, social work, and others approaches. The focus of palliative care is to relieve suffering of children with cancer and promote the best quality of life for children and their families. Palliative care is appropriate at any childhood stage, and also at any stage of cancer. It can be provided along with curative treatment to child and his family.⁽²³⁾

Continuous educational program for nurses keep them up to date on the latest advances in nursing care and treatment.⁽²⁴⁾The present

study was conducted to evaluate the effect of educational program on nurses' competency regarding providing palliative care for children with advanced stage of cancer.

The present study showed that, mean age of the studied nurses was 40.333 ± 11.457 years. This finding was in accordance with **Dedeli et al (2016)**⁽²⁵⁾ who made a study to assess nurses' attitudes towards patients with cancer and found that the average age of the nurses was 40-55 years. This result was contraindicated with **Al Qadire (2013)**⁽²⁶⁾ and **Karkada1 et al (2012)**⁽²⁷⁾ whose studies revealed that the majority of the studied sample were younger adult which may be due to different sample and different setting.

Regarding nurses' educational level, the current study showed that less than two-thirds of the studied nurses had graduated from nursing school diplom while, less than one-fifth of them had completed their university nursing education and the rest of them had a technical nursing institute education. These results were supported by

Soubam (2018)⁽²⁸⁾ who found that the majority of nurses had graduated from nursing school diplom. **Bahza (2013)**⁽²⁹⁾ also, stated that nurses who had nursing diplom were the highest proportion in his study. **El-Nagar etal(2013)**⁽³⁰⁾ reported a contradicting finding in her study as she found most of the studied nurses had bachelor degree.

As regards to years of experience of the studied nurses inside Pediatric Hematology and Oncology Unit, it was observed that less than one third of the studied nurses had from 30 to less than 40 years of experience and one-fifth had from 10 to less than 20 years of experience. This result was in contrast with **Mahmoud (2014)**⁽³¹⁾ who mentioned that two-thirds of the studied nurses in his study had 5 years of specialty experience. **Premetal (2012)**⁽³²⁾ also, found that the majority of studied nurses in his study had from two - five years experiences at oncology department.

As regards, nurses' level of knowledge about childhood cancer and palliative care, the current study revealed that there was an improvement in the total level of nurses'

knowledge regarding the childhood cancer and palliative care immediately and one month after the implementation of educational program. While, less than two-thirds of them had low level of knowledge regarding childhood cancer and palliative care before the implementation of educational program. This may be attributed to the lack of specific palliative care units in Egypt, the fact that palliative care education wasn't incorporated into nursing curriculum, and lack of in-service educational program about childhood cancer and palliative care or training courses.

This finding was in agreement with **AlQadire (2013)**⁽²⁶⁾, **Karkada1 (2012)**⁽²⁷⁾, **Prem (2012)**⁽³²⁾, **Ayed (2015)**⁽³³⁾ and **Pfister (2013)**⁽³⁴⁾, whose studies assessed nurses' knowledge about palliative care and found that the overall level of knowledge about palliative care was poor. The current findings weren't in harmony with the findings of **Fadare etal(2014)**⁽³⁵⁾ and **Chover (2017)**⁽³⁶⁾ whose studies also assessed nurses' knowledge about palliative care, and found that the majority of nurses had good knowledge about palliative care.

The Present study revealed that, immediately and one month after the implementation of educational program, nurses total score of knowledge improved as all the nurses had high level of knowledge. This may be attributed to the use of multiple teaching methods, the development of educational program based on nurses' needs, the clarity and simplicity of its content, and the use of simple language and the frequent repetition to fix such knowledge.

This result was in agreement with **Ayed et al(2015)⁽³³⁾**, **Saylor et al (2016)⁽³⁷⁾**, **Sorifa et al(2015)⁽³⁸⁾** and **Brazil et al (2012)⁽³⁹⁾**, who found a significant improvement with the number of nurses who achieve a good score immediately and in the post period. This finding also agreed with the study conducted by **Young-Ran et al (2015)⁽⁴⁰⁾** who stated that, the knowledge of nurses was higher immediately after educational program implementation about palliative care and in the follow up period. **Joy(2015)⁽⁴¹⁾** and **Kim et al. (2012)⁽⁴²⁾** were in the same line and found that nurses in the intervention group demonstrated a significant increase of

palliative care knowledge immediately and one month after the intervention.

As regards nurses' competency skills about pediatric palliative care, the current study showed that, most of the studied nurses weren't competent in providing palliative care before the implementation of the educational program. This finding could be explained by only a few nurses have been trained on palliative care, nurses do n't feel competent enough to deliver palliative care to children. Also, it may be attributed to increase work overload, and lack of periodic training and education. These findings were in the same line with **El-Nagar et al (2013)⁽³⁰⁾** who found that nurses weren't professional in providing palliative care. Also, **Anteneh et al (2016)⁽⁴³⁾** agreed with this finding and stated that, more than half of the nurses in his study had poor practice toward palliative care.

On the other hand, there was an improvement in the total level of nurses' competency immediately and one month after the implementation of educational program than before. This finding was in the same line with **El-Nagar et al(2013)⁽³⁰⁾** who found that there was statistically significant

difference in pre/ post education relating to symptom management of cancer patients. Also, **Abaszadeh et al (2012)**⁽⁴⁴⁾ was in harmony with the finding of the current study and showed that nurses' practice increased immediately and after one month of the educational program. This improvement may be attributed to that structured and continues nursing education are effective in improving the competency of the nurses.

The current study revealed that, there was no significant statistical correlation between nurses' age and total knowledge. This finding was in agreement with that of **Prem et al (2012)**⁽³²⁾ who found no significant statistical correlations between palliative care total knowledge scores and age. This finding wasn't in line with **Soubam et al (2018)**⁽²⁸⁾ who found that nurses with adequate knowledge of palliative care had higher mean age. Also, **Karkada et al (2012)**⁽²⁷⁾ revealed a significant association between the age of the nurses and their knowledge about palliative care.

The current study revealed that, all nurses' total knowledge improved regardless educational level immediately and one

month after the educational program. This may be due to that, the structured educational program met nurses' educational needs. **Ayed et al (2015)**⁽³³⁾ was in the same line of the current study and found that there was no significant correlation between knowledge scores about palliative care and academic level of nurses.

Moreover, the present study revealed that there was positive correlation between nurses' knowledge and their years of experience before implementing the educational program. This may be attributed to the fact that, older nurses with more years of experience exposed to different situations in hematology and oncology units which subsequently improved their knowledge. These finding was in accordance with **Morsy (2014)**⁽⁴⁵⁾ who found that knowledge of palliative care was influenced by years of nursing experience.

This finding wasn't in agreement with **Prem et al (2012)**⁽³²⁾ who found that, no significant statistical correlations between palliative care total knowledge scores and nurses' years of experience.⁽³²⁾ **Ayed et al**

(2015)⁽³³⁾ found that there were no significant correlation between knowledge scores and professional experience.

In addition, there was positive correlation between scores of total nurses' competency and their age before, immediately and one month after program implementation. This may be explained by, increasing nurses' age, exposure to different situations and cases may positively affect their practice and competency. **Thomas (2012)**⁽⁴⁶⁾ wasn't in the same line with the present study and reported that, no significant association was found between competencies scores of studied nurses regarding palliative care and their age.

The current study revealed that, there was positive correlation between scores of total nurses' competency and their years of experience. On the same line was **Morsy et al (2014)**⁽⁴⁵⁾ mentioned that, total performance of health care providers was associated with increase in nurses' years of experience. Also, **Fahim et al(2014)**⁽⁴⁷⁾ agreed with this result and found that there was a significant statistical relation between

years of experience and total mean practices scores.

The current study revealed that there were significant positive correlations between all palliative care competency domains and each others before, immediately and after one month of the program. **El-Nagar et al (2013)**⁽³⁰⁾ agreed with this finding as she reported that, the nurses should apply all competency items and domains for better outcomes.

The current study revealed that there was positive correlation between total nurses' knowledge and their competency. This may be due to the fact the successive educational sessions using different educational strategies and continuous evaluation improving nurses' knowledge and competencies. Additionally, palliative care education helps nurses felt comfortable in providing care to dying children and their families. This finding was consistent with the findings of **Sorifa et al (2015)**⁽³⁸⁾ who indicated that there was a positive correlation between knowledge and competency scores of palliative care by nursing staff.

Conclusion and Recommendations

Based on the results of the present study, it can be concluded that there was a significant improvement in nurses' knowledge and competencies after the implementation of the educational program in relation to palliative care for children with advanced stage of cancer than before implementing it. There was a positive correlation between the total knowledge scores among the studied nurses and the total competency scores of nursing intervention for children with advanced stage of cancer.

Recommendations:

The following recommendations are suggested:

For nursing practice:

1. Designing a procedure handout about palliative care for nurses caring of children with advanced stage of cancer.
2. Continuous in-service training program should be conducted periodically in order to

update nurses' knowledge and improve their competencies levels regarding pediatric palliative care.

For nursing education:

1. Pediatric palliative care must be incorporated into undergraduate and postgraduate nursing education curriculum.
2. Conducting regular conferences and workshops to update nurses' knowledge and competencies related to palliative care.

For future nursing researches:

1. Application of the current study on a larger sample to improve generalizability.
2. Application of competency based nursing intervention to children with advanced cancer.
3. Developing an educational program for parents to promote spiritual wellbeing and coping with childhood cancer.
4. Developing a clinical pathway of palliative care for nurses to provide high quality nursing care for children with advanced cancer.

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