

## The Effect of Web-based Pediatric Palliative Care Educational Sessions on Knowledge and Reported Practices of Nurses at Assiut University Children's Hospital

Shadia Abd Elmoniem Syan<sup>1</sup>, Howayda Mohammed Ali<sup>2</sup>, Amira Hassan Abd Alfatah Ahmed<sup>3</sup>

<sup>1</sup>Lecturer of Pediatric Nursing, Faculty of Nursing, Sohag University, Egypt

<sup>2</sup>Lecturer of Pediatric Nursing, Faculty of Nursing, Minia University, Egypt

<sup>3</sup>Lecturer of Pediatric Nursing, Faculty of Nursing, Assiut University, Egypt

### Abstract

**Background:** The ability to deliver comfort-based therapies to enhance a patient's quality of life makes palliative care knowledge crucial for nursing personnel taking care of children with serious illnesses. **Aim:** Evaluate the effect of web-based pediatric palliative care educational sessions on the knowledge and reported practices of nurses at Assiut University Children's Hospital. **Research Design:** A Quasi-experimental research design was utilized in this research. **Subjects:** Included a purposive sampling of 91 nurses was documented in this research. **Tools of data collection:** Two tools included Nurses' knowledge towards pediatrics palliative care, Nurses' personal characteristics tool and Nurses' reported practice regarding pediatric palliative care **Results:** The majority of the studied nurses (91.2%) had poor knowledge while only (8.8%) of them had good knowledge before web-based education compared to sixty- six percent of them (65.9%) had good knowledge after implementation of web-based education. A statistically significant difference was present between the pretest and posttest scores of the nurses regarding the palliative care knowledge level and self-reported palliative care practices (P value <0.001). **Conclusion:** Nurses' knowledge as well as reported practices related to pediatric palliative care were enhanced after the implementation of the web-based pediatric palliative care education. **Recommendations:** To educate all of the pediatric nurses in the hospital, more educational sessions were recommended.

**Keywords:** Pediatric; Palliative Care; Nurse's Knowledge and Practice & Web-Based Education.

### Introduction

Lack of pediatric palliative care (PPC) is an issue that is now prevalent in many developing nations and requires special consideration and effort from numerous sectors to address. It is crucial to provide an integrated model of palliative care (PC) at diagnosis of a life-threatening and debilitating illness that continues via the

illness's course, regardless of the outcome.<sup>(1)</sup>

The (WHO) World Health Organization described PC as "the controlling as well as relief of sufferings of the pediatric patients and families facing the issues connected with life-threatening illness".<sup>(2)</sup> the PPC is a philosophy and an organized technique for giving individualized care for life-threatening as well as debilitating illness.<sup>(3)</sup>

The key objectives of PC are control of symptom, emotional support and care coordination. Provision of comfort care is the most crucial form of PC. Comfort is a state of effortless and wellbeing that has been affected by nursing care activities, which in turn enables individuals manage distress symptom, enhance functional condition, and enhance their quality of life(QOL).<sup>(4)</sup>

People with any disease can receive compassionate care through PC and all healthcare professionals, regardless of their position or area of expertise are able to give PC also known as "primary PC " when necessary to treat symptoms in patients who are suffering from any condition.<sup>(5)</sup>

The "2<sup>nd</sup>" PC describe the treatment of symptoms or side effects of treatment that can be applied by medical professionals other than PC when they care for their patients. "Tertiary" PC describe as the work done by PC experts in circumstances needing more difficult care for suffering relief, including but not control to pain as well as anxiety. Additionally, it describes the process of setting up PC networks and services, such as those for hospice, in-hospital, residential, and out-patient care. In order to encourage a prompt referral of ill person with burdensome symptoms or unintended side effects of treatments, tertiary PC should be incorporated into routine clinical practice. This could potentially prevent these side effects from arising in their initial stages.<sup>(6)</sup>

Saving the optimal QOL for those suffering from dangerous diseases, particularly in their late stages, is crucial to the philosophy

of PC.<sup>(7)</sup> Primarily since the 1960s, when Cicely Saunders started to show interest in the care of these individuals and established the "hospice" concept.<sup>(8)</sup>

The objectives of PPC are to enhance competent, understanding, as well as continuous care to the children as well as their family. Also it is advantage to encourage that PPC is not only for the process of end- life, but also required to enhance consistent support to them and regardless of whether the patient receives therapy, PC continues once an illness is diagnosed. The first step in the process involve learning about the family, determining their requirement, providing comfort for persisting symptoms, and offering support up until the end of life and during the grieving process.<sup>(9)</sup>

One of the most important and essential components of PC is the coordination of services. Children who are terminally ill as well as their families require the help and direction of a healthcare expert who is similar with their situation and who can organize their treatment as they move between numerous places and healthcare organizations. Compared to other healthcare providers, nurses are more likely to interact with PC patients. Setting up a caring program for nurses is just as vital as their practical education as well as must, so, be involved in education program due to the considerable required for as specific services among patients as well as society.<sup>(10)</sup>

Additionally, PPC describe as essential for children with life-threatening illnesses as well as their families facing substantial difficulties in caring for them. They can

alleviate difficult symptoms while improving QOL throughout the course of the disease. <sup>(11)</sup>

The majority of hospitals' NICU and PICU nurses may lack the knowledge, attitudes, and beliefs necessary to recognize children as well as families who could advantage from PC. The most common misconception among medical team about PC is that it is hospice as well as only applies to patients who are close to death. <sup>(12)</sup>

There are an estimated 21.6 million children who need PC worldwide, yet many areas of the world, especially those with limited resources, do not have access to these services. <sup>(13)</sup> The American Academy of Pediatrics (AAP) understood the value of PPC and the critical necessity for prompt referral. <sup>(14)</sup> Referrals take longer when nurses are unaware of PC and how it can provide compassionate care.

Recent studies in multiple nations among nurses working in various aid fields have revealed that they exhibit knowledge gaps when treating this type of patient. Results from qualitative research that evaluated these experts and gathered their opinions on the need for additional PC training have shown this shortage of competencies. It must be noted that these investigations were conducted among nurses who acquired their professional expertise in various workplaces. Despite these deficiencies being recognized on a global scale, certain variations can be identified among the various levels of treatment. <sup>(15)</sup>

Nurses have noted a general limit of understanding in a number of PC areas, including the philosophy, practice's

principles, pain also the management of symptom, as well as transitions from therapeutic to supportive care. <sup>(16)</sup> Nurses who serve the children with illnesses and life-threatening should receive training so that, they can recognize the various needs of them and become skilled at giving timely PC. <sup>(17, 18)</sup>

Also the educational program pertaining to the guidelines for PC is necessary to enhance nurses' gap of knowledge to enhance QOL for children with a life-threatening as well as debilitating illness also support their needs. Integrating nurses' knowledge, abilities, and positive attitudes towards PC is required to deliver efficient, high-quality treatment. <sup>(16, 18)</sup>

One significant category of nursing education approaches and practices is computer-assisted education. It has been used in nursing education because it is simple to access, adapts to various learning styles especially, web-based education that supports nursing education by giving access to data without space or time restrictions and by providing a network where nurses and researchers meet interactively. <sup>(19)</sup>

**Significance of the study:** Restricting PC to hospice exclusively can prolong or stop referral processes, lowering QOL and worsening pain. <sup>(20)</sup> Children lack access to skilled medical professionals regarding at-home pain and symptom treatment due to limited availability of pediatric-specific PC and hospice services. The most frequent obstacles to prompt PC referrals are attitudes against PCC and a lack of education. <sup>(11)</sup>

Lack of education can also affect how nurses practice PC. Negative attitudes may

result from inadequate PC nursing training and education and may have an effect on the quality of care. <sup>(18)</sup> Therefore, the current study aimed to evaluate the effect of web-based pediatric PC educational sessions on the nurses' levels of knowledge and practice who cares for children diagnosed with life-serious as well as debilitating illness.

#### **Aim of the study:**

This research aimed to evaluate the effect of web-based pediatric palliative care educational sessions on the palliative care knowledge level and reported practices of the pediatric nurses.

#### **Hypothesis**

**H1:** Web-based education is expected to improve nurse's level of knowledge regarding PPC.

**H2:** Nurse's reported practices are expected to be enhanced after using Web-based education.

#### **Subjects and Methods**

##### **Research design:**

This research used a pretest-posttest quasi-experimental research approach.

##### **Setting:**

The study was performed in Pediatric Intensive Care Unit, Premature Intensive Care Unit and Pediatric Surgical Care unit at Assiut University Children's Hospital.

##### **Sample**

A purposive sample of 91 nurses who are working at the previously mentioned units of Assiut University Children's Hospital. Nurse's number from these units were (46) from Premature Intensive Care Unit (ICU), (25) from Pediatric ICU and (20) from Surgical Ward. The following criteria were used to choose the study participants:

##### **Inclusion criteria:**

-Years of experience not less than one year.

##### **Exclusion criteria:**

-Nurses not willing to participate in the study.

##### **Tools of the study:**

**Two tools were used for this research as following:**

##### **Tool I: (Nurses Knowledge towards PPC)**

In accordance with the setting of Ethiopia, a knowledge questionnaire was adapted from the PC quiz for nurses (PCQN) and earlier research (**Hiwot Kassa., 2014, Ross MM,1996**) <sup>(21,22)</sup>

The instrument has two sections which are:

##### **Section one:** Socio- Demographic variables.

Socio- Demographic data of the nurses as (age, gender, as well as level of education, year of working experiences, current working pediatric ward , experience in caring terminal ill child and previous training on PPC).

**Section two:** knowledge question arranged as Yes ,No, as well as Don't know questions PCQN in in earlier research with an internal consistency of 0.78 with score span from 1-17one to seventeen the highest score (equal or more than 75%) mean good knowledge (**Hiwot Kassa., 2014& Stanley M, Pollard D, 2013**) <sup>(21,23)</sup> . involving the questions regard (definition, benefits, principles, PC philosophy, Only patients who are rapidly deteriorating should receive PC, the disease's extent describe the method of treatment for the pain, provision of PC need emotional detachment, as well as nurse role in the PC.

**Scoring of scale:** The scoring system include 1 for the correct answers, 0 for the

answer's incorrect as well as 2 for I don't know. Good knowledge equal or more than 75% of total score of the PCQN scale , Poor knowledge less than 75% of the PCQN scale total score.

**Tool II:** Nurses' reported practice related to PPC include eleven practical questions designed on pain assessment guide as well as pain rating scales practical questionnaires as well partially from (APCA/POS) African PC Association/ palliative outcome scale for Africa (2012).<sup>(24)</sup>

**Scoring of scale:** The scoring system include 1 for the correct answers as well as 0 for the answer's incorrect.

Reported practice reflects nurses' practice of PPC = the nurse should have a knowledge on PC related to application of practice.

Satisfactory practice = equal or more than 75% of total knowledge aspect of practice questions.

Unsatisfactory practice = less than 75% of total knowledge aspect of practice questions.

**-Validity and Reliability of the Tools:** A panel of five pediatric university professors evaluated the tools' content validity (coverage, clarity, phrasing, length, format, and overall appearance) and determined that both tools had a 93% for the 1<sup>st</sup> tool and the 2<sup>nd</sup> tool 95% validity index. The experts' accept on the content, but suggested minor language modification that would make the data clearer as well as more precise. The items of the tools internal consistency reliability was assessed by utilized Cronbach's test (it was 0.78 for 1<sup>st</sup> tool knowledge questions in previous research which indicate as high internal consistency

and 0.86 for 2<sup>nd</sup> tool nurses reported practices.

**Ethical Considerations:** This research was performed under the agreement from the Ethical Committee at the Faculty of Nursing Assiut University. The study's objectives were explained to participants, who also became aware that they could withdraw from the study at any moment without giving any cause. Their involvement in the study was regarded as their approval. They were told that the information acquired would be personalized as well as only the researchers working on the study had access to the data.

**Pilot Study:** The pilot research was applied on ten percent (9 nurses) of the participants. The goal was to evaluate the study's validity as well as the instruments' use and clarity. Further to determine the time required for form completion. The participants for the pilot research were involved in the research's sample.

#### **The web -based pediatric PC educational program**

The web -based PPC education program was designed by the researchers depend on assessment phase and post reading the related literatures.<sup>(25, 26, 27)</sup>

#### **It was applied in in 4 phases as the following:**

**a) Assessment phase:** The researchers evaluate the nurse's data as; age, as well as education's level and years of experience...etc.

**b) Planning phase:** This phase involved the arrangement for the environment of the program such as schedule's teaching, methods as well as materials of the teaching

(word, pdf, and presentation) time of the teaching: The time of the program is reported related to the suitable time for the nurse's group, if anyone missing the teaching time he/she can reach the session any time on the website.

**Modules of education as well as their contents:**

**Module1. Introduction to PPC program:** discuss the purpose of the educational program.

**Module2. PC, its aim, current status in Egypt and the world as well as individuals included in PC team.** Also this module's material covered a number of subtopics, including the definition of PC, its goal, the state of PC services in Egypt and throughout the world, and information on the team members who make up a PC team.

**Module3. PC nursing:** That defines PC nursing and discuss their duties and responsibilities.

**Module4. Symptom management in PC-1 (pain, dyspnea(difficult in breathing), (disturbance of the digestive system as diarrhea-, nausea, constipation vomiting, as well as loss of appetite) :** include a definition of symptoms, an explanation of the causes and contributing factors, an acknowledgment of the methods used to evaluate symptoms, a discussion of pharmacological and non-pharmacological treatment options, and the choice of the best nursing care for the symptom. Also encourage to create a nurse care plan for these symptoms.

**Module5. Symptom management in PC-2 (mucositis, delirium, fatigue, disorders of the sleep, skin issues, neutropenia,**

**thrombocytopenia, anemia):** are managed by defining the symptoms, outlining the causes of the symptoms, understanding how to assess the symptoms, talking about pharmacological as well as non-pharmacological management options and selecting the best nursing intervention for the symptom.

**Module6. Communication in PC:** emphasis on knowing the appropriate methods of communication with the patient as well as their family as well as the factors that should be taken into account.

**Module7. Spiritual care of the patient as well as his/her family:** Focus is placed on understanding the nurse's role in providing spiritual care, learning scenarios that could be problematic for the patient and his or her family, and talking about the best nursing interventions.

**Module8. End-of-life care:** The nursing that should be used pre, during, and post death are made clear in this module care, along with the function and significance of nurses in the care provided during the grieving process as well as the care that should be given to their family.

**c) Program Implementation:** The educational program was conducted for three months; six modules for the first two months and two modules for the third month to complete the program contents. To run the program, a time schedule that was appropriate for nurses was created, which contained the date, location, topic, time, as well as length of each session. Moreover The training program contained of 2 parts, 1<sup>st</sup> part the theoretical part involved (definition, principles, reasons, philosophy,

benefits, as well as role of nurse regarding PC, ect...) and the 2<sup>nd</sup> part was practical parts regarding application of practice (it must include practice for ex pain management, pain assessment, management of symptoms etc..).

**d) Evaluation stage:** After the finishing of the module's contents, the nurses' knowledge as well as reported practices were assessed one time to evaluate the impact of web depend on educational program related to PPC.

**Field of Work:** The real fieldwork was done from the starting of May 2023 to the finishing of July 2023. The ethical agreement was obtained from the Ethical Committee at the Faculty of Nursing - Assiut University to Assiut University Children Hospital's manager as well as the directors of previous mentioned setting to gather the data post the purpose of the study was clarified.

In the beginning each nurse was meet for about ten to twenty minutes to fill out all items in the form. Approximately ten nurses were meted/day twice/week (total number of nurses in the week is 20). Then they were classified into twenty groups of about four or five nurses in each session as well as a link of the educational program topics were given to every nurse. Nurses that sharing in the educational program tasks for 30 minutes five days/week. The approximately time to finishing the post-test form twenty to thirty minutes.

**Program Construction:**

The educational program consider the nurses' needs to know about PC in order to increase their knowledge and practices

related to PPC, For simple understanding, the materials were presented in English and Arabic. The program was available to the nurses through a website containing eight lectures that have been uploaded online, making it simple for them to access the materials as well as presentations in video, Word and Pdf format from any location at any time. In order to communicate with the nurses, the researchers used both online and offline messaging options. An announcement (notification) module is also available, allowing text messages to be delivered to registered nurses' mobile phones to advise them of important information. Scales and questionnaires were used to gather the actual data. The website was introduced to the nurses following the delivery of the pretest. Four sessions each week were taken include basic PPC followed by sophisticated PC. And post-test was done after two weeks of the pretest.

**Statistical design and Data analysis**

The Statistical Package for the Social Sciences (SPSS) version 20 was utilized for data analysis. Analyzed descriptive statistics were mean, standard deviation (SD), as well as frequency for continuous variables and categorical data, respectively. Chi square test (X<sup>2</sup>) was utilized to compare qualitative variables as the test of significance to assess alternative in the before-intervention as well as after-intervention program implementation. The Pearson correlation coefficient was utilized to compare factors and individual traits. When the p-value was 0.05 or less, the level of significance was determined to be significant, and when the

p-value was 0.001 or less, the level of

### Results:

#### Table (1):

**Illustrates Socio- demographic data for studied nurses.** Where two thirds (60.4%) of study subjects were between the ages of 21 and 30 years and the majority (92.2%) of them were females. Regarding to nurses' education, more than two thirds of nurses (69.2%) had nursing diploma and graduated from technical institute of nursing; while nearly third of them had Bachelor's degree in nursing. Moreover half of them (50.5%) working in neonatology ward while (22%, 27.5%) working in surgical and pediatric intensive care units respectively. Furthermore, (85.7%) of study subjects not attend PPC training. Two thirds of them (62.6%) didn't receive PPC information previously. While more than one third of study subjects (37.4%) received PPC information previously and half of them (50%) receive information via hospital.

**Table (2): Shows nurses' knowledge toward PPC before and after web-based education.** It was found that, high percentage of study subjects (86.8%, 87.9%, 92.3, 98.9%) had correct answers about definition of PC, the provision of PC requires emotional detachment, For individuals who work in PC, burnout is unavoidable due to the accumulation of losses, Despite all odds, families of children with fatal illnesses should have hope respectively posttest compared to (16.5%, 20.9%, 35.2%, 41.8%) respectively pretest. There was a highly statistically significant difference ( $P = <0.001$ ).

significance was extremely significant.

**Table (3): This table indicates the relationship between studied nurses' practice toward PPC before and after web-based education.** Which demonstrates a highly statistically significant difference ( $P = 0.000^{**}$ ) between pre as well as post web-based education in all characteristics of reported practice.

**Table (4): Presents the relationship between studied nurses' total knowledge toward PPC with their demographic data before and after web-based education.** There was no significant difference between the nurses' total knowledge toward PPC with their age, gender, education level, pediatric wards, years of experience and experience in caring terminal ill child before and after web-based education ( $P > 0.05$ ).

**Table (5): Demonstrates the relationship between studied nurses' total knowledge with their status of obtaining information, and training regarding PPC before and after web-based education.** There was no significant difference between the nurses' total knowledge toward PPC with their status of obtaining information, training and the method of access to information before and after web-based education ( $P > 0.05$ ).

**Table (6): Presents the relationship between studied nurses' total practice toward PPC with their demographic data before and after web-based education.** There was a significant difference ( $P = 0.008^{**}$  &  $P = 0.016^{*}$ ) between the nurses' total practice toward PPC with their education level and years of experience before and after web-based education.



**Table (7): Shows the relationship between studied nurses' total practice with their status of obtaining information, and training regarding PPC before and after web-based education.** There was no significant difference between the nurses' total practice toward PPC with their status of getting information, training and the techniques of access to information before and after web-based education ( $P > 0.05$ ).

**Figure (1): Shows the total knowledge scores of nurses toward PPC before and after web-based education.** It is clear from this figure, that (91.2%) of nurses had poor knowledge before web-based education implementation. While more than two thirds of them (65.9%) had good knowledge after implementation of web-based education.

**Figure (2): This figure clarifies the relationship between studied nurses' total practice toward PPC before and after web-based education.** It is clear from this figure that more than half of studied nurses (53.8%) had a good knowledge aspect of practice after web-based education, while most nurses (94.5%) had poor knowledge aspect of practice before web-based education.

**Figure (3): Scatterplot illustrating a positive correlation: hypothetical data for the relationship between nurses' total knowledge and total practice towards PPC.** There was statistically significant strongly positive correlation between nurses' total knowledge and their total practice toward PPC before web-based education and there was statistically significant moderate positive Correlation after web-based education ( $P < 0.001^{**}$ ).

**Table (1): Socio- demographic data for studied nurses (n=91)**

Items	No	%
<b>Age</b>		
21: 30 yrs.	55	60.4
31: 40 yrs.	23	25.3
41:50 yrs.	10	11.0
> 50 yrs.	3	3.3
<b>Gender</b>		
Female	84	92.2
Male	7	7.8
<b>Education level</b>		
Technical Institute of Nursing &Nursing Diploma	63	69.2
Bachelors in nursing	22	24.2
Masters in nursing	4	4.4
Other study certificate / diploma /degree	2	2.2
<b>Year of experience working in pediatric ward</b>		
< 5 yrs.	17	18.7
5:10 yrs.	17	18.7
11:15 yrs.	45	49.5
> 15 yrs.	12	13.2
<b>Pediatric ward</b>		
Surgical ward	20	22.0
Neonatology ward	46	50.5
PICU (Pediatric Intensive Care Unit)	25	27.5
<b>Experience in caring terminal ill child</b>		
Every day	9	9.9
One time every week	35	38.5
One time every month	26	28.6
Few times every year	16	17.6
Never	5	5.5
<b>Nurses receive training on PPC</b>		
Yes	13	14.3
No	78	85.7
<b>If yes how long you had</b>		
1-2 week	10	76.9
1 month	3	23.1
<b>Previous information about PPC</b>		
Received information previously	34	37.4
Don't receive information previously	57	62.6
<b>Source of information</b>		
Internet	2	5.9
Hospital	17	50.0
Pediatrics books	8	23.5
Scientific conferences	3	8.8
Pediatric workshop	4	11.8

**Table (2): Relationship between studied nurses' knowledge toward PPC before and after web-based education (n=91)**

Items	Pre				Post				X2	P. value
	Incorrect		Correct		Incorrect		Correct			
	No	%	No	%	No	%	No	%		
Do you know the definition PC?	76	83.5	15	16.5	12	13.2	79	86.8	90.12	0.000**
Only certain circumstances are suitable for PC. a downward trend or deteriorating circumstances	70	76.9	21	23.1	19	20.9	72	79.1	57.19	0.000**
The type of pain management depends on the severity of the sickness.	78	85.7	13	14.3	20	22	71	78	74.37	0.000**
Adjuvant therapies are important in managing pain	73	80.2	18	19.8	22	24.2	69	75.8	57.28	0.000**
When morphine is used to manage pain on a long-term basis, drug addiction is a significant issue	73	80.2	18	19.8	22	24.2	69	75.8	57.28	0.000**
The provision of PC needed emotional detachment	72	79.1	19	20.9	11	12.1	80	87.9	82.42	0.000**
Drugs that can cause respiratory depression are suitable for the managing of severe dyspnea in terminal stages of an illness	69	75.8	22	24.2	25	27.5	66	72.5	42.6	0.000**
The aggressive treatment attitude is compatible with that of PC	71	78	20	22	19	20.9	72	79.1	59.44	0.000**
When treating certain types of pain, the use of placebo is appropriate	69	75.8	22	24.2	37	40.7	54	59.3	23.13	0.000**
Meperidine (Demerol) is not a reliable analgesic for treating persistent pain.	79	86.8	12	13.2	48	52.7	43	47.3	25.04	0.000**
For individuals who work in PC, burnout is unavoidable due to the accumulation of losses	59	64.8	32	35.2	7	7.7	84	92.3	64.28	0.000**
Manifestation of chronic pain are various from those of acute pain.	65	71.4	26	28.6	16	17.6	75	82.4	53.41	0.000**
Families of terminally ill children have the option to use "Do not resuscitate (DNR)"	70	76.9	21	23.1	15	16.5	76	83.5	66.77	0.000**
Despite all odds, families of children with fatal illnesses should have hope	53	58.2	38	41.8	1	1.1	90	98.9	71.2	0.000**
Elevation in Vital sign assist as pain evaluation tool	66	72.5	25	27.5	14	15.4	77	84.6	60.31	0.000**
Children under the age of two have diminished pain sensitivity and poor recollection of painful experiences due to their immature neural systems	75	82.4	16	17.6	17	18.7	74	81.3	73.94	0.000**
Most children who can be distracted from discomfort do not experience severe pain. Even in extreme discomfort, patients can sleep	78	85.7	13	14.3	21	23.1	70	76.9	71.96	0.000**

Chi square test, \*\*=statistically significant difference (p<0.01)

**Table (3): Relationship between studied nurses' practice toward PPC before and after web-based education (n=91)**

Items	Pre				Post				X2	P. value
	Incorrect		Correct		Incorrect		Correct			
	No	%	No	%	No	%	No	%		
When do you institute PC discussion?	72	79.1	19	20.9	20	22	71	78	59.44	0.000**
Do you tell the family that the condition of their child is terminal??	73	80.2	18	19.8	23	25.3	68	74.7	55.11	0.000**
What aspects do you take into account when interacting with the family's critically sick child?	77	84.6	14	15.4	24	26.4	67	73.6	62.49	0.000**
How would you approach the child's family with spiritual matters and your worries?	74	81.3	17	18.7	30	33	61	67	43.44	0.000**
Culture assessment during child care should include	71	78	20	22	26	28.6	65	71.4	44.7	0.000**
How should psychological problems of the child in daycare be handled?	75	82.4	16	17.6	30	33	61	67	45.58	0.000**
Who do you include in decision-making regarding a child's condition in your current practice?	66	72.5	25	27.5	19	20.9	72	79.1	48.76	0.000**
When families of terminally sick children or children as his age inquire about the state of their condition, you think them as	64	70.3	27	29.7	29	31.9	62	68.1	26.94	0.000**
Information communication to the family of the terminally ill child depends on	75	82.4	16	17.6	24	26.4	67	73.6	57.61	0.000**
Types of painkillers and analgesics that are frequently prescribed in your clinic for pain	7	7.7	84	92.3	0	0	91	100	7.28	0.007**
How do you assess children pain?	76	83.5	15	16.5	27	29.7	64	70.3	53.7	0.000**

Chi square test, \*\*=statistically significant difference (p<0.01)

**Table (4): Relationship between studied nurses' total knowledge toward PPC with their demographic data before and after web-based education (n=91)**

Items	Nurses' Knowledge toward PPC										X2	P. value		
	Before Education					After education								
	Poor knowledge		Good knowledge		X2	P. value	Poor knowledge		Good knowledge				X2	P. value
	No	%	No	%			No	%	No	%				
<b>Age</b>														
21: 30 yrs.	50	60.2	5	62.5	0.31	0.957	19	61.3	36	60.0	0.30	0.960		
31: 40 yrs.	21	25.3	2	25.0			7	22.6	16	26.7				
41:50 yrs.	9	10.8	1	12.5			4	12.9	6	10.0				
> 50 yrs.	3	3.6	0	0.0			1	3.2	2	3.3				
<b>Gender</b>														
Female	77	92.8	7	87.5	0.29	0.593	30	96.8	54	90.0	1.32	0.250		
Male	6	7.2	1	12.5			1	3.2	6	10.0				
<b>Education level</b>														
Technical Institute of Nursing as well as Diploma Nursing	57	68.7	6	75.0	0.62	0.891	24	77.4	39	65.0	3.61	0.307		
Bachelors in nursing	20	24.1	2	25.0			4	12.9	18	30.0				
Nursing Masters	4	4.8	0	0.0			2	6.5	2	3.3				
Another field of study certificate or diploma /degree	2	2.4	0	0.0			1	3.2	1	1.7				
<b>Year of experience working in pediatric ward</b>														
< 5 yrs.	14	16.9	3	37.5	3.31	0.347	3	9.7	14	23.3	2.64	0.451		
5:10 yrs.	17	20.5	0	0.0			6	19.4	11	18.3				
11:15 yrs.	41	49.4	4	50.0			17	54.8	28	46.7				
> 15 yrs.	11	13.3	1	12.5			5	16.1	7	11.7				
<b>Pediatric ward</b>														
Surgical ward	17	20.5	3	37.5	1.28	0.528	6	19.4	14	23.3	0.58	0.747		
Neonatology ward	43	51.8	3	37.5			15	48.4	31	51.7				
PICU	23	27.7	2	25.0			10	32.3	15	25.0				
<b>Experience in caring terminal ill child</b>														
Every day	7	8.4	2	25.0	3.58	0.466	3	9.7	6	10.0	2.89	0.576		
One time every week	32	38.6	3	37.5			12	38.7	23	38.3				
One time every Month	25	30.1	1	12.5			10	32.3	16	26.7				
Few times every year	14	16.9	2	25.0			6	19.4	10	16.7				
Never	5	6.0	0	0.0			0	0.0	5	8.3				

Chi square test, \*\*=statistically significant difference (p&lt;0.01)

**Table (5): Relationship between studied nurses' total knowledge with their status of obtaining information and training regarding PPC before and after web-based education (n=91)**

Items	Nurses' Knowledge toward PPC											
	Before Education						After education					
	Poor knowledge		Good knowledge		X2	P. value	Poor knowledge		Good knowledge		X2	P. value
	No	%	No	%			No	%	No	%		
<b>Have you take training on PPC?</b>												
Yes	10	12.0	3	37.5	3.86	0.049*	4	12.9	9	15.0	0.07	0.7860
No	73	88.0	5	62.5			27	87.1	51	85.0		
<b>If yes how long you had</b>												
1-2 week	8	80.0	2	66.7	0.23	0.631	4	100.0	6	66.7	1.73	0.188
1 month	2	20.0	1	33.3			0	0.0	3	33.3		
<b>The status of obtaining information about PPC</b>												
Received information about PPC previously	32	38.6	2	25.0	0.57	0.449	10	32.3	24	40.0	0.52	0.469
Don't receive information about PPC previously	51	61.4	6	75.0			21	67.7	36	60.0		
<b>The techniques of access to information about PPC</b>												
Internet	2	6.3	0	0.0	4.65	0.325	0	0.0	2	8.3	3.33	0.504
Hospital	17	53.1	0	0.0			7	70.0	10	41.7		
Pediatric books	7	21.9	1	50.0			2	20.0	6	25.0		
Scientific conferences	3	9.4	0	0.0			0	0.0	3	12.5		
Pediatric workshop	3	9.4	1	50.0			1	10.0	3	12.5		

Chi square test, \*=statistically significant difference (p<0.05)

**Table (6): Relationship between nurses' total practice toward PPC with their demographic data before and after web-based education (n=91)**

Items	Practice of Nurses toward PPC											
	Before Education						After education					
	Poor knowledge aspect of practice		Good knowledge aspect of practice		X2	P. value	Poor knowledge aspect of practice		Good knowledge aspect of practice		X2	P. value
	No	%	No	%			No	%	No	%		
<b>Age</b>												
21: 30 yrs.	53	61.6	2	40.0	3.65	0.302	22	52.4	33	67.3	2.40	0.494
31: 40 yrs.	20	23.3	3	60.0			13	31.0	10	20.4		
41:50 yrs.	10	11.6	0	0.0			5	11.9	5	10.2		
> 50 yrs.	3	3.5	0	0.0			2	4.8	1	2.0		
<b>Gender</b>												
Female	79	91.9	5	100.0	0.44	0.507	39	92.9	45	91.8	0.03	0.855
Male	7	8.1	0	0.0			3	7.1	4	8.2		
<b>Education level</b>												
Technical Institute of Nursing as well ass Diploma Nursing	59	68.6	4	80.0	0.48	0.924	36	85.7	27	55.1	11.73	0.008**
Bachelors in nursing	21	24.4	1	20.0			4	9.5	18	36.7		
Nursing Masters	4	4.7	0	0.0			2	4.8	2	4.1		
Another field of study certificate or diploma /degree	2	2.3	0	0.0			0	0.0	2	4.1		
<b>Year of experience working in pediatric ward</b>												
< 5 yrs.	16	18.6	1	20.0	2.69	0.442	2	4.8	15	30.6	10.35	0.016*
5:10 yrs.	17	19.8	0	0.0			10	23.8	7	14.3		
11:15 yrs.	41	47.7	4	80.0			23	54.8	22	44.9		
> 15 yrs.	12	14.0	0	0.0			7	16.7	5	10.2		
<b>Pediatric ward</b>												
Surgical ward	17	19.8	3	60.0	5.05	0.080	9	21.4	11	22.4	0.05	0.975
Neonatology ward	44	51.2	2	40.0			21	50.0	25	51.0		
PICU	25	29.1	0	0.0			12	28.6	13	26.5		
<b>Experience in caring terminal ill child</b>												
Every day	8	9.3	1	20.0	2.96	0.565	7	16.7	2	4.1	5.19	0.269
One time every week	34	39.5	1	20.0			15	35.7	20	40.8		
One time every Month	25	29.1	1	20.0			12	28.6	14	28.6		
Few times every year	14	16.3	2	40.0			7	16.7	9	18.4		
Never	5	5.8	0	0.0			1	2.4	4	8.2		

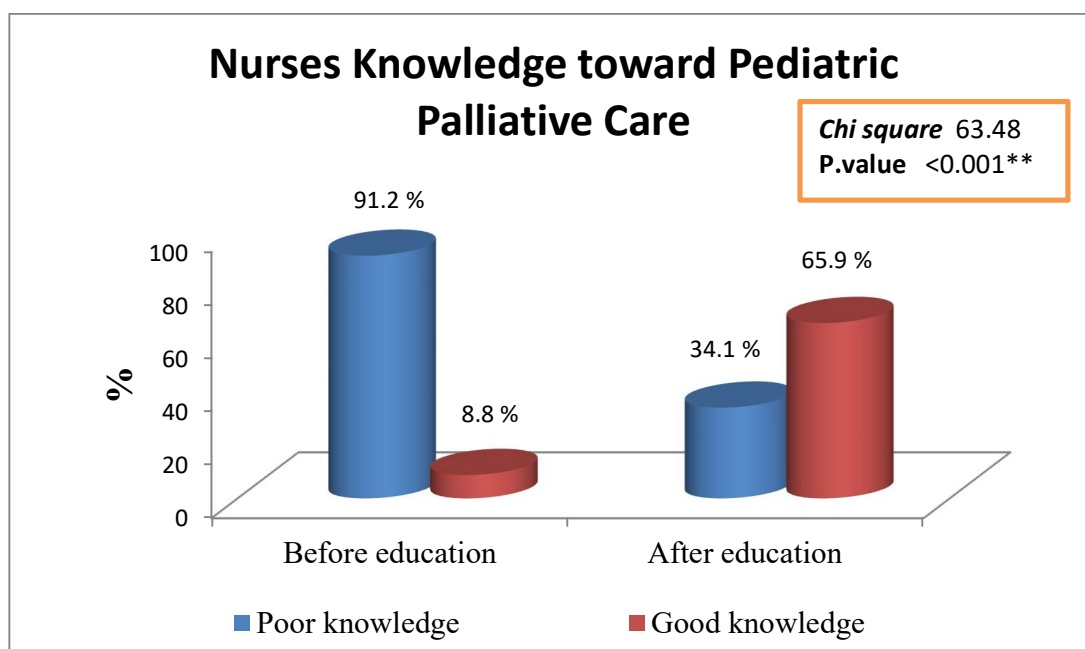
*Chi square test, \*=statistically significant difference (p<0.05), \*\* statistically significant difference (p<0.01)*

**Table (7): Relationship between nurses' total practice with their information and training regarding PPC before and after web-based education (n=91)**

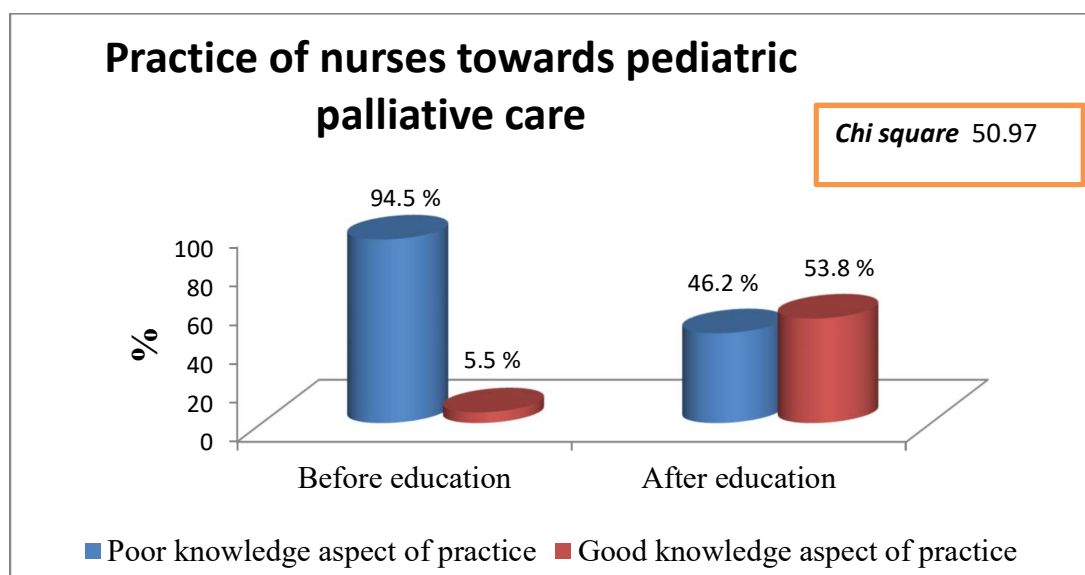
Items	Nurses' Practice toward PPC											
	Before Education						After education					
	Poor knowledge aspect of practice		Good knowledge aspect of practice		X <sup>2</sup>	P. value	Poor knowledge aspect of practice		Good knowledge aspect of practice		X <sup>2</sup>	P. value
	No	%	No	%			No	%	No	%		
<b>Have you take training on PPC?</b>												
Yes	13	15.1	0	0.0	0.88	0.348	5	11.9	8	16.3	0.36	0.548
No	73	84.9	5	100.0			37	88.1	41	83.7		
<b>If yes how long you had</b>												
1-2 week	10	76.9	0	0.0	-	-	4	80.0	6	75.0	0.04	0.835
1 month	3	23.1	0	0.0			1	20.0	2	25.0		
<b>The status of obtaining information about PPC</b>												
Received information about PPC previously	32	37.2	2	40.0	0.02	0.900	14	33.3	20	40.8	0.54	0.462
Don't receive information about PPC previously	54	62.8	3	60.0			28	66.7	29	59.2		
<b>The techniques of access to information about PPC</b>												
Internet	2	6.3	0	0.0	3.45	0.485	1	7.1	1	5.0	4.99	0.288
Hospital	16	50.0	1	50.0			8	57.1	9	45.0		
Pediatric books	8	25.0	0	0.0			1	7.1	7	35.0		
Scientific conferences	3	9.4	0	0.0			1	7.1	2	10.0		
Pediatric workshop	3	9.4	1	50.0			3	21.4	1	5.0		

Chi square test, \*=statistically significant difference ( $p < 0.05$ ), \*\* statistically significant difference ( $p < 0.01$ )

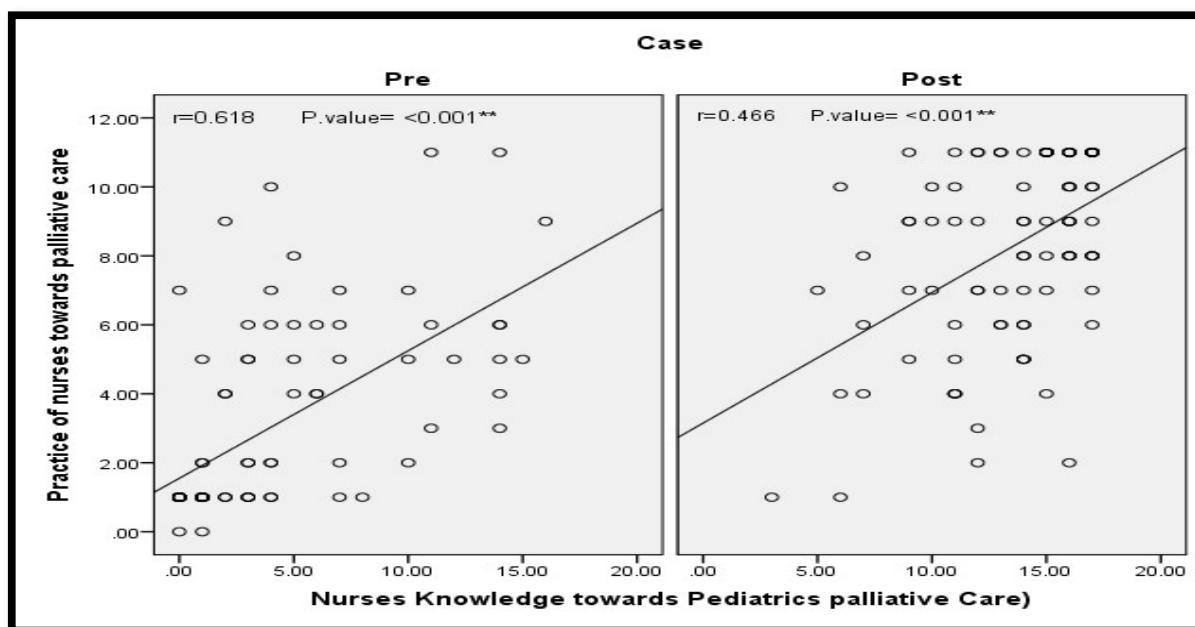




**Figure (1):- Relationship between studied nurses' total knowledge toward PPC before and after web-based education (n=91)**



**Figure (2): Relationship between studied nurses' total practice toward PPC before and after web-based education (n=91)**



**\*\* Statistically Significant correlation at P. value <math><0.01</math>**

**Figure (3): Correlation Co-efficient between studied nurses' total knowledge and their practice toward PPC before and after web-based education (n=91)**

### Discussion

Pediatric nurses can support children and their families by educating them and identifying children who could use PC services. Children with life-threatening and severe illnesses may experience a lower QOL if nurses lack the training in PC necessary to support this comfort care procedure. The purpose of this study was to evaluate the effect of web-based PPC education on the knowledge and reported practices of nurses.

In this study, it was believed that educating pediatric nurses about PC online, conducting discussions while using prepared case

studies, answering nurses' questions in a virtual chat room, as well as resources nurses' viable to facilities were helpful in revealing differences between the pre and post web-based education program and raising the knowledge levels of PC.

Regarding nurses' socio-demographic data the results presented that the highest percent of nurses were females. Also two thirds had more than ten years of work experience where nearly half and one tenth of studied nurses have eleven to fifteen and more than fifteen years of experience respectively. In addition nearly one tenth received PC training. More than two thirds of them were

between the years of 21-30 years. These findings were consistent with a study of (Al-Kindi SG et al, 2014) <sup>(28)</sup> who gave questionnaire, received responses from all nurses. They were primarily female. Only one third had formal PC training, whereas nearly two thirds had more than ten years of professional experience. Instead of a lack of time, interest, or money, this may be attributed to the absence of PC courses.

In addition, (Kim et al, 2020) <sup>(29)</sup> conducted a study on 102 nurses to assess their knowledge, attitude, confidence and educational need toward PC found that the majority of the participants were female. Also Al Qadire, M. (2014) <sup>(30)</sup> who assessed registered nurses' knowledge about PC at Jordanian. More than half of the nurses were younger than 30 years.

On the other hand these results were in consistent with Al Qadire, M. (2014) <sup>(30)</sup> found that more than half of participants were male.

The actually study revealed that higher than sixty-six percent of participating nurses have good knowledge post the application of web-based education program compared to most of them have poor knowledge before web-based education program implementation. which indicate a highly statistically significant difference ( $P < 0.001^{**}$ ) between before as well as after web-based education program in all characteristics of knowledge level. The substantial reason for this might be only one tenth of all studied nurses were trained on PPC. These findings were consistent with many studies which use intervention studies using a pretest-posttest design to assess how

well information gained from a training program has improved (Chrastek, J.R.; Gordon, P 2017 & Abuhammad, S.; Almasri, R 2021) <sup>(31,32)</sup>

The study of Akdeniz Kudubes A, Bektas M. (2020) <sup>(33)</sup> determined that for the nursing students' knowledge level on the PC knowledge form, the posttest score as well as the test before posttest score difference of the participated group were statistically greater than those of the control group (P.05). Also, (Harden et al., 2017) <sup>(34)</sup> who stated that after the educational intervention, they noticed a quantitatively significant variation in knowledge, attitudes, and actions. A mean PCQN score of 8.88 1.75 was obtained in a different study. (Aboshaiqah AE , 2019) <sup>(35)</sup> which were consistent with our results. Congruent findings were reported by Bektaş and Yardımcı (2018) <sup>(36)</sup> who stressed the need of using the opportunities offered by technology in nursing education to expand students' knowledge and skills. Similar findings were reported by Bhatnagar S, Patel A (2018) <sup>(37)</sup> indicated students' knowledge and skill levels rose as a result of web-based educational programs, simulation software, and video-supported educational programs.

Also in the research of O'Shea et al (2015) <sup>(38)</sup> stated that in order to increase the efficacy of the education and the degree of knowledge, it was discovered that the use of films, case studies, web-supported applications, role-plays, and simulation approaches in PC education programs aimed at nursing students was crucial. These findings emphasize the significance of

theoretical and practical training for nurses in this area in order to provide the highest caliber of care to their patients.

However, this result does not match that of a study conducted in the Harari Regional State of Ethiopia (56%), according to **Meaza D (2014)** <sup>(39)</sup>It's probable that this is because hospital policy prevented them from incorporating PC training into their regular tasks.

The literature does not contain any web-supported studies examining pediatric nurses' PC procedures. However, studies exploring the impact of computer-assisted learning and other educational models on nursing students' PC practices have been published in the literature.(**Achora S, Labrague LJ 2019 ,Chover-Sierra E, Martínez-Sabater A 2018 & Nakazawa Y etal, 2018**) <sup>(16, 40, 41)</sup>

The actually research demonstrates that more than half of studied nurses had a good knowledge aspect of practice after web-based education program, while most nurses had poor knowledge aspect of practice before web-based education program which indicate a highly statistically significant difference ( $P = <0.001^{**}$ ) between before and after web-based education program in all characteristics of reported practice this was consistent with **Akdeniz Kudubes A, Bektas M.(2020)** <sup>(33)</sup> They found that the self-reported PC practices scale posttest score and the pretest–posttest score difference of the study group of pediatric nursing students were statistically greater than those of the control group ( $P.05$ ).

Also the study conducted by (**Samuel ,A etal, 2016**) <sup>(42)</sup> to assess nurses' knowledge,

attitude, practice as well as associated factors towards PC, evidence that more than half of the participants had poor Knowledge of practice regard PC which was in line with the present study.

On the other hand these results were in consistent to the research conducted by (**Meaza D., 2014**) <sup>(39)</sup>mentioned that 61.4% of participants in the Harari regional state displayed positive PC behavior, according to the study. In addition (**Kassa, H., R etal,2014**) <sup>(43)</sup> done a study in Addis Ababa justified that slightly more than three quarters of the nurses had good practice towards PC. This may be due to the participants in this study having more than ten years of work experience, where two thirds of nurses had more than ten years, as the number of years of experience is significantly correlated with the knowledge component of practice, with the amount of practice reported decreasing as the number of years of working experience increases.

The actually research revealed statistically significant strongly positive correlation among nurses' total knowledge as well as their total practice toward PPC where ( $r = 0.618$ ,  $P = <0.001^{**}$ ) in pre web -based education phase and ( $r = 0.466$ ,  $P = <0.001^{**}$ ) in post web -based education phase. This finding was an essential outcome meant the effectiveness of the study which was consistent with the study of **Akdeniz Kudubes A, Bektas M.(2020)** <sup>(33)</sup> they also looked into how quickly the knowledge level and PC practices of the study's pediatric nursing students changed. Receiving the education improved the degree of knowledge by 0.310 times

( $P=.310$ ), even though the education program only accounted 9.6% ( $r^2=0.096$ ) of the increase in knowledge. On the other hand, getting the education raised the level of change in self-reported PC practices by 0.600 times ( $P=.600$ ), and the education program explained 36% ( $r^2=0.360$ ) of the increase in the amount of the change in those practices.

This important finding, which demonstrated the efficacy of the study, was attributed to the educational program for pediatric nurses' knowledge and practice requirements, symptom management, which has an impact on PC knowledge and practices, communication, care provided during the dying process, and spiritual care.

Related nurses' knowledge toward PPC the actually study evidence that high percentage of nurses had correct answers post the education compared with their percentages pre education in all items related to PC results in a highly statistically significant difference ( $P= 0.000^{**}$ ) These findings were congruent with the Cross-sectional study applied by **Senthel P Kumer (2012)** <sup>(44)</sup> A self-report questionnaire with 20 statements about the philosophy of PC, pain, dyspnea, psychiatric issues, and gastro-intestinal difficulties was given to 363 nurses in a multispecialty hospital to gauge their knowledge of PC. The results show a low level of general awareness regarding Pc, with knowledge of its philosophy, pain management, and usage of morphine to treat dyspnea being shown at 36.6%, 34.9%, and 28.3% respectively. Also the study of **Al Qadire, M. (2014)** <sup>(30)</sup> evaluate that 190 registered nurses working in 5 government

hospitals in Jordan made up the sample, which demonstrates that nurses have a lack of understanding and misconceptions regarding PC. With a range of 0 to 15 or (58%), the overall mean score for PC knowledge was low at 8.3 (SD, 2.8).

Regarding nurses' practice toward pediatric PC the present study found a highly statistically significant difference ( $P= 0.000^{**}$ ) between before and after web-based education in all characteristics of reported practice. Where high percentage of them had correct answers post the education compared with their percentages pre education This was in line with a survey conducted by **(Margaret M.R,1996)** <sup>(45)</sup> stated that 91.9% of the 228 pediatric nurses who participated in the study (Knowledge and Practice, Care of Dying Children) said they learn through trial and error practice.

Our study portrayed that socio-demographic characteristic of studied nurses such as age, gender, education level, pediatric wards, years of experience and experience in caring terminal ill child showed no significant association with their knowledge before and after web-based education program ( $P> 0.05$ ). This result contradicted Chinese **(Jiang,Q etal,2019)** <sup>(46)</sup> and Greece **(Dimoula, M, etal,2019)** <sup>(47)</sup> studies that reported high knowledge among female students.

This result is different with the study of **(Samuel ,A etal, 2016)** <sup>(42)</sup> the result explained that compared to nurses with a diploma, those with a bachelor's degree were 1.88 times more likely to have strong computer skills. Additionally, individuals with more than 5 years of experience had

knowledge that was 1.97 times better than that of those with fewer than 5 years of experience. This may be because the participants have been engaged in their professions for a long time and have been exposed to a variety of situations that have increased their familiarity with PC-related activities. However, there was no statistically significant relationship between a nurse's level of knowledge about PC and their age, practice area, or experience caring for patients who were close to death. (Samuel ,A etal, 2016) <sup>(42)</sup> which were in line with the present findings.

Regarding the relationship between studied nurses' total knowledge with their status of obtaining information and training regarding PPC before and after web-based education. The findings revealed that the percentage of nurses who received PC training who demonstrate good knowledge level were more than those who don't receive training ( $P=0.049^*$ ) this was consistent with (Martínez-Sabater A etal,2021) <sup>(48)</sup> who examined the impact of PC training on knowledge levels found that individuals who reported training received higher percentages of accurate answers. Also (Samuel ,A etal, 2016) <sup>(42)</sup> indicated that nurses who had received PC training were 2.03 times more likely to have superior knowledge of PCs than those who had not.

Regarding the relationship between studied nurses' total practice and their demographic data toward PPC before and after web-based education there was a significant difference between the nurses' total practice toward PPC with their education level and years of

experience before and after web-based education.

Years of experience are strongly correlated with the knowledge component of practice; the more years of experience, the less practice is reported. Where two thirds of studied nurses had more than ten years of work experience were consistent with (Kassa, H., R etal, 2014) <sup>(43)</sup> They found a substantial correlation between years of experience and the knowledge aspect of practice; the more years of experience, the less practice was reported. This could be attributable to the fact that the idea of PC is still developing. A seasoned nurse could regard their practical knowledge as their strongest suit. Overall, the more experienced they are, the less they attend training sessions, seminars, and other events where they can stay current. Additionally, there are no library books or journals in the hospital where they work.. On the other hand the good knowledge aspect of practice scores of nurses in pre web-based education phase were higher than those in post web-based education phase. Which reveals a statistically significant difference ( $P=0.016^*$ )

Additionally, the web-based PPC teaching model provided students with an opportunity for exploratory learning that lessens their worries about patients who are nearing the end of their lives. Another study emphasized how important it was for nursing faculty students to feel confident about the continuity of their education and their ability to provide PC to children and their families before graduating and how effective the use of various training methods was. (Adib-

**Hajbaghery M, Sharifi N,2017)** <sup>(49)</sup> It is emphasized that PC education should be included in undergraduate education curricula and that web-based technological approaches should be implemented along the teaching process in order to aid nursing students in developing good clinical decision-making abilities in PC practices. **(Forbes H etal ,2016)** <sup>(50)</sup>

The research's results were found to be consistent with those found in the relevant literature. In this study, the nursing practices and PC subjects in the web-supported education program were successful in causing a difference to appear between the pre and post education periods.

**Conclusion:** depend on the results of the actually study, it can be concluded that, the research hypothesis is accepted while it was found that, the web-based educational sessions is an effective method to enhance the nurses' knowledge as well as reported practice regarding pediatric PC. There was statistically significant strongly positive correlation between nurses' total knowledge and their total practice toward pediatric PC before web-based education and there was statistically significant moderate positive Correlation after web-based education.

### Recommendations

**On the basis of the research's findings, the following suggestions are put forth:**

1- The knowledge level of nurses working in various pediatric departments at Assiut University Children's Hospital in Assiut City, as well as the impact of PC

education on pediatric nurses' practices, are therefore both important research topics.

- 2- Web-based education and other training methods regarding PPC must be added to the curriculum of nursing undergraduate.
- 3- PC should be involved in the orientation program of the new nurses at Pediatric settings.
- 4- To update PPC standards of practice in response to changes made by the National Hospice and PC Organization, the institution should undertake an annual education program.
- 5- Continuous training program and workshops concerning symptom management, communication techniques, and referral procedures should be included.
- 6- Through the PPC referral procedure, other healthcare professionals can benefit from this education to increase their knowledge and teamwork.
- 7- The PC services should be provided from the time of diagnosis of life-threatening illness.

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