

Original Article

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Impact of educational programs on nurses' knowledge and attitude toward pediatric palliative care

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Abstract

Objective. This study aims to assess the knowledge and attitude of nurses toward pediatric palliative care (PPC) and examine the impact of an educational program on pediatric nurses' knowledge and attitude regarding PPC for children facing life-threatening illnesses or chronic diseases in Jordan.

Method. A quasi-experimental design was used. Exactly 120 pediatric nurses participated in the study, of which 60 were in the intervention group and 60 in the control group.

Results. The results of the study showed that nurses had a low score in knowledge and attitude toward PPC. The mean knowledge score of PPC for the control group is 6.88 (SD = 2.26), while that of the intervention group was 7.92 (SD = 1.99; $p = 0.052$). The mean attitude for PPC score for the control group was 95.88 (SD = 7.90), while that of the intervention group was 100 (SD = 10.95; $p = 0.009$). Also, the educational intervention had a significant positive effect on the knowledge and attitude toward PPC among nurses.

Significance of the results. Based on the result of this study, the authors found strong evidence of the effectiveness of the PPC educational program when it came to improving the nurses' knowledge and attitude toward PPC services and offer us an effective educational program.

Introduction

Pediatric palliative care (PPC) represents “a special, closely related field to pediatric palliative care” (WHO, 2018a, 2018b). The PPC is used to enhance the quality of life for the children and decrease their suffering. The PPC is comprehensive and includes all dimensions of a child's life (WHO, 2018a, 2018b). More than 21 million children required PPC for life-threatening diseases. The benefits of PPC not just improve the quality of life for the patients and their families but also benefit the health system in decreasing health care cost by reducing unnecessary hospital admission (Gans et al., 2012; Chong et al., 2018; Abuhammad et al., 2021a). Unfortunately, only 14% worldwide of people who need it currently receive it as it is related to some barriers (WHO, 2018a, 2018b). PPC is still considered an emerging and new specialty for many nurses (Khraisat et al., 2017). There is a need to increase PPC care services because of the increasing number of children with cancer in Jordan. There are 333 per 100,000 new cases of cancer in children less than 18 years old (Abuhammad et al., 2021b). The healthcare providers who contact children could play a primary dynamic and inventive role in improving the quality of PPC for children who need it (Fitch et al., 2015; Terzioglu and Uslu Sahan, 2015). However, the lack of knowledge and training for these providers are considered as major barriers to improve access to PPC in Jordan (Khraisat et al., 2017). PPC requires a broad multidisciplinary approach that includes nurses, doctors, social workers, chaplains, and other therapists (Abuhammad et al., 2021c). The nursing profession is one of the main professions in PPC team members and connection ring with other team members (Fitch et al., 2015; Terzioglu and Uslu Sahan, 2015).

The available literature has shown that nurses, like other healthcare providers, lacked knowledge of PPC, which is reflected in their attitudes (Thompson et al., 2009; Chen et al., 2013; da Silva et al., 2015; Guimarães et al., 2016; Balkin et al., 2018; Detsyk et al., 2018). Examining the pediatric nurse's knowledge and attitude toward PPC is a very important aspect for nurses and may help in developing PPC care in Jordan, which increases benefits to the pediatric patients and their families and may assist in healthcare settings. Improving a nurse's knowledge of PPC by using an educational program was found to be effective in the literature also (O'Shea et al., 2011; Haut et al., 2012; Younge et al., 2015; Bouri et al., 2017). There have been few research studies conducted in Jordan among nurses to evaluate the effectiveness of the educational program on the nurse's knowledge and attitude toward PPC (Khraisat et al., 2017).

This study hoped to provide attention to PPC topics and their importance while also providing evidence of the need to develop guidelines for the educational need for nurses.

Considering that Jordan health services are like the surrounding countries in the Middle East, the result of this study may be not only beneficial for the Jordanian health system but also for other Middle Eastern health systems. In addition, few studies in the literature investigate the nurse's knowledge and attitude and the effect of educational intervention in Jordan. So, this study will fill this gap in the literature and will hopefully highlight some important guidelines for PPC education for nurses in Jordan. This study aims to (1) assess the knowledge and attitude of nurses toward PPC, (2) evaluate the effectiveness of an educational program on the pediatric nurse's knowledge and attitude regarding PPC for children facing life-threatening illnesses or chronic diseases in Jordan, and (3) determine the association between knowledge and attitude toward PPC.

Method

Study design

A quasi-experimental design was used in this study to evaluate the effectiveness of an educational program on the nurses' knowledge and attitude regarding PPC in the pediatric departments in two government hospitals. This design is considered practical related to the possibility of conducting true experiments in a natural setting (Polit and Beck, 2013).

Setting

The study was conducted in two hospitals in North Jordan: a government educational hospital (Princess Rahma Educational Hospital, PREH) and a university educational hospital (King Abdullah University Hospital, KAUH). These hospitals provide pediatric healthcare services for pediatric patients. All nurses in the two hospitals have a bachelor's degree or postgraduate degree. These hospitals also offer continuous education courses to improve their staff's knowledge, but PPC education courses are still not given in either hospital.

Sample and sampling

All nurses working in the pediatric departments were considered a target population. Nurses who were previously working in pediatric departments of the selected hospitals were considered an accessible population. In this study, KAUH nurses were considered an experimental group, and PREH nurses were considered a control group. The inclusion criteria for the participants were: (1) both gender nurses who work in the pediatric departments regardless of their experience, (2) able to communicate in the English language, and (3) willing to participate. Practical nurses were excluded since they did not work directly with children who were placed in PPC departments, and their work focused on bedding and vital signs in Jordan. Moreover, nurses were excluded if they had worked in the King Hussein Cancer Center previously because this center offers PPC services that may impact the result of this study. The G power software was used to calculate the sample size. Based on a power level of 0.8, a significant alpha level of 0.05, and a moderate effect size of 0.25, the adequate sample size for two nonequivalent groups pre-/post-test design is 80. An additional 40 nurses were added to retrieve the drop rate and incomplete data. A total of 120 participant nurses who met the inclusion criteria were enrolled in the study. A convenience sampling technique was used to enroll the participants.

Instruments

Demographic part

This involves demographic information regarding gender, age, religion, marital status, children, workplace, years of experience in general, years of experience in pediatric departments, educational level, current working department, having PPC educational courses previously, and working in King Hussein Cancer Center previously.

The nurse's knowledge of PPC

This was used to examine the knowledge of PPC among nurses (PCQN). This tool consists of 20 statements. The answers range from zero for wrong or not knowing the answer to one point for the right answer. The components of this tool are the philosophy of PPC, pain management, and social aspect. The categories of knowledge were poor ($\leq 50\%$), enough (65–50%), and good ($\geq 65\%$), according to the original author. The internal validity of the tool was 0.78 (Ross et al., 1996). The reliability of the instrument in this study was 0.83.

The nurse's attitude toward PPC (Frommelt, 1991)

The attitude toward PPC tool was used, developed by Dr. Frommelt in 1991. This tool contains 30 items that used five-Likert attitude scale scores that were coded from 1 (strongly disagree) to 5 (strongly agree) (Mastroianni et al., 2015). The attitude scores were poor ($\leq 50\%$), enough (65–50%), and good ($\geq 65\%$) according to the original author of the tool. The validity was 0.98, and the test-retest reliability $r = 0.94$ (Frommelt, 1991). The reliability of the tool in this study was 0.95.

Ethical consideration

The Institutional Review Board of Jordan University of Science and Technology and the Institutional Review Board of the Ministry of Health were taken. This study was conducted with full attention to human rights preservation because the study had personal interaction with the subjects and included sharing of participants' private information. The nurses who enrolled in the study were given the necessary information about the study. All nurses signed the consent form. Maximum effort was taken to ensure the confidentiality and anonymity of the participants by identifying nurses by their numbers instead of their names. There was no risk to participating in this study when they agreed to participate in the study. At any time, the nurses were free to withdraw without it affecting their care. The content of the educational program (videotapes and leaflets) was sent to the nurses in the control group after completion of the study procedure.

Intervention

The PPC educational program was given to the nurses in the experimental group (KAUH nurses). The educational program consists of eight sections: introduction, pain assessment and management, communication with children and emotional issues, child development and play in PPC, grief and bereavement, end-of-life care, perinatal palliative care, and symptoms other than pain in PPC. The educational session lasted for 5 h continuously because the participants were asked to arrange the education in response to their working conditions.

During the session, the research team used a PowerPoint presentation by laptop, discussion with participants, and used the

WhatsApp application to send the presentation to the participants. The main resource of the educational material was retrieved from the International Children's Palliative Care Network: elearning (elearnicpcn), which is a web-based training course for children's palliative care, appropriate for any discipline, including doctors, clinical officers, nurses, counselors, social workers, and spiritual leaders (Elearnicpcn, 2020). The courses are available for anyone with internet access for free and endorsed by the University of South Wales (one of the largest universities in the UK). The material was re-ordered at an appropriate level and in a culturally appropriate style by the researcher after getting permission from the original author. For example, the researcher started with communication with children and emotional issues before starting with pain since this is more appropriate to get the nurses' attention.

Data collection

The permission from the head nurse of pediatric departments was taken by the researcher in the two hospitals. Nurses who met the inclusion criteria were invited to participate using social media or contact details. Once they agreed to participate, a consent form was taken. The data collection procedure was conducted between February 2020 and May 2020.

Experimental group

All nurses working in KAUH were considered a target group for the experimental group. Upon taking the consent form from the participants, they were asked to complete a pre-test questionnaire that was previously described under the instrument section. The nurses could choose their preferred time and place for the educational program. Then, the educational session was admitted to the participants using a PowerPoint presentation by laptop. Afterwards, the presentation was sent to the participants in the same session using the WhatsApp application. Finally, when the session finished, the participants were asked to complete the post-test questionnaire using WhatsApp in response to the precaution of COVID-19 outbreak at the time of data collection that prevented using papers, and a simple gift was given to them as a thank you for participating in the study. All nurses working in EPRH were considered a target group for the control group. Upon taking the consent form from the participants, they were asked to complete the questionnaire two times by using an online questionnaire that was sent using the WhatsApp application. The same educational program and supporting videos were sent to the control group since the training at the same time was difficult to achieve in response to the COVID-19 outbreak. However, the authors sent their contact information for any queries regarding the educational material.

Data analysis

The SPSS program was used to analyze the data after it was coded, entered, and checked for accuracy. The demographic data, such as gender, age, educational level, experience, and other characteristics, were analyzed. A baseline comparison between the nurses in the two groups was conducted with the bivariate chi-squared test of association and independent sample *t*-test to assess any differences between the two groups of nurses on key relevant socio-demographic and professional characteristics.

Results

Description of the demographic characteristics and professional experience of the participants

Descriptive statistics were conducted to describe the characteristics of the total study sample. The total sample recruited for the two groups consisted of 120 nurses. Half of them worked in KAUH ($n = 60$, 50%), and the other half worked in PREH ($n = 60$, 50%). Most of the nurses were female pediatric nurses ($n = 115$, 95.8%), leaving few male pediatric nurses ($n = 5$, 4.2%). The age of the sample ranged from 23 to 47 ($M = 33.68$ years, $SD = 5.2$; see Table 1).

Two groups post-test scores of PPC knowledge

A chi-squared test was used to compare the questions answered correctly between the intervention and control groups after attending the educational session for PPC. The results yielded a significantly different pattern of responses to the PPC knowledge questions, which shows that the nurses who received the educational session (the intervention group) were significantly more likely to have answered the questions correctly (Q1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 14, and 16). Q1 "PPC is only appropriate for situations with great deterioration" ($p = 0.010$), Q2 "Morphine is a standard opioid for PPC" ($p < 0.001$), Q3 "The severity of disease impacts the therapeutic plan" ($p = 0.068$), Q4 "Complementary medicine is vital for treating pain" ($p = 0.006$), Q5 "It is important for the family to stay beside the child during death" ($p = 0.004$), Q7 "Addiction is a major problem for PPC" ($p < 0.001$), Q8 "Children who are using opioids need to use a special plan" ($p = 0.001$), Q9 "PPC feel detachment" ($p = 0.001$), Q11 "Males generally repair their sadness faster than females" ($p < 0.001$), Q12 "Aggressive treatment equals PPC philosophy" ($p < 0.001$), Q14 "Codeine causes more symptoms than morphine" ($p = 0.002$), and Q16 "Demerol is not a good choice for treating pain" ($p = 0.003$). See Table 2 for details.

Two groups post-test scores of PPC attitude

Descriptive analysis and an independent sample *t*-test were used to compare the nurses' attitudes between the two groups of nurses after attending the educational session. The resulting analysis findings with an independent sample *t*-test suggested that a new pattern of attitudes emerged after the educational session was given to the intervention group. To explain, the nurses in the intervention group had agreed significantly more than the control group with regard to questions 1, 2, 4, 6, 12, 16, 21, 23, 24, 25, and 27. Q1 "Caring for dying people is a good experience" ($p = 0.013$), Q2 "Death is not a bad experience" ($p < 0.001$), Q4 "PPC should continue during the grief period" ($p < 0.001$), Q6 "The nurse should not talk about the child's condition to the family member" ($p = 0.003$), Q12 "The child's family should be part of PPC" ($p = 0.004$), Q16 "Emotional support is required for the child's family" ($p = 0.009$), Q21 "The dying children need to speak about their feelings" ($p = 0.017$), Q23 "A flexible schedule is required for dying children" ($p < 0.001$), Q24 "Children and their families are responsible for making decisions" ($p < 0.001$), Q25 "Addiction is not considered a main problem for PPC" ($p < 0.001$), and Q27 "The nurse should answer all the child's questions" ($p < 0.001$). See Table 3 for details.

Table 1. Descriptive analysis of the nurses socio-demographic and professional characteristics (N = 120)

	N (%)	Control	Exp		p-value
Sex		2 (3.3)	3 (5)	$\chi^2(1) = 0.21$	0.648
Male	5 (4.2)	58 (96.7)	57 (95)		
Female	115 (95)	35.98 (4.84)	31.18 (4.41)	$t(118) = 5.70$	<0.01
Age group (years)					
23–30 years	36 (30)	6 (10)	30 (50)	$\chi^2(2) = 29.4$	<0.01
31–38 years	61 (50.8)	34 (56.7)	27 (45)		
≥39 years	23 (19.2)	20 (33.3)	3 (5)		
Marital state					
Never married	15 (12.5)	4 (6.7)	11 (18)	$\chi^2(1) = 3.73$	0.05
Ever married	105 (87.5)	56 (93.3)	49 (81)		
With children					
No	24 (20)	6 (10)	18 (30)	$\chi^2(1) = 7.5$	0.06
Yes	96 (80)	54 (90)	42 (70)		
Overall Nursing experience years, mean (SD)	10.3(5.9)	13.4(5.8)	7.3(4.)	$t(109.7) = 6.5$	< 0.01
Experience years in nursing categorized					
1–6 years	39 (32.5)	8 (13.3)	31 (51.7)	$\chi^2(1) = 38.4$	<0.001
7–13 years	43 (35.8)	18 (30)	25 (41.7)		
14–20 or more years	38 (31.7)	34 (56.7)	4 (6.7)		
Experience years in pediatrics, mean (SD)	8.99 (6.01)	11.62(6.31)	6.3(4.36)	$t(104.3) = 5.3$	<0.001
Experience years in pediatrics categorized					
1–6 years	52 (43.3)	14 (23.3)	38 (63.3)	$\chi^2(2) = 25.10$	<0.001
7–13 years	41 (34.2)	23 (38.3)	18 (30)		
14–20 years	27 (22.5)	23 (38.3)	4 (6.7)		
Nursing educational level					
Bachelor of Nursing	107 (89.2)	55 (91.7)	52 (86.7)	$\chi^2(1) = 0.78$	0.378
Master degree or higher	13 (10.8)	5 (8.3)	8 (13.3)		
Working department					
Medical	34 (28.3)	20 (33.3)	14 (23.3)	$\chi^2(4) = 10.21$	0.037
Surgical	22 (18.3)	6 (10)	16 (26.7)	-	
NICU	23 (19.2)	13 (21.7)	10 (16.7)		
PICU	22 (18.3)	8 (13.3)	14 (23.3)		
Others	19 (15.8)	13 (21.7)	6 (10)		
Taken course on PPC previously					
No	120 (100)	0	60 (100)	$\chi^2(1) = 120$	<0.001
Working in department giving PPC workshops		60 (100)	0		
No	120 (100)	6.88 (2.26)	7.92 (1.99)	$t(118) = 1.97$	0.052
Have you worked at KHCC previously		95.88(7.90)	100.00 (10.95)	$t(118) = 2.66$	0.009
No	120 (100)	2 (3.3)	3 (5)	$\chi^2(1) = 0.21$	0.648
Current working hospital		58 (96.7)	57 (95)		
King Abdullah University Hospital	60 (50)	35.98 (4.84)	31.18 (4.41)	$t(118) = 5.70$	<0.001
Princess Rahma Educational Hospital	60 (50)				

Table 2. Comparison of nurses' PPC knowledge at post-intervention time between the two analyzed groups

	Control group, <i>n</i> = 60	Intervention group, <i>n</i> = 60	$\chi^2/df = 1$	<i>p</i> -value	
1	Palliative care is appropriate only in situations where there is evidence of a downhill trajectory or deterioration				
	Incorrect, <i>n</i> (%)	25 (41.7)	12 (20)	6.60	0.010
	Correct, <i>n</i> (%)	35 (58.3)	48 (80)		
2	Morphine is the standard used to compare the analgesic effect of other opioids				
	Incorrect, <i>n</i> (%)	42 (70)	9 (15)	37.14	<0.001
	Correct, <i>n</i> (%)	18 (30)	51 (85)		
3	The extent of the disease determines the method of pain treatment				
	Incorrect, <i>n</i> (%)	57 (95)	51 (85)	3.33	0.068
	Correct, <i>n</i> (%)	3 (5)	9 (15)		
4	Adjuvant therapies are important in managing pain				
	Incorrect, <i>n</i> (%)	15 (25)	4 (6.7)	7.60	0.006
	Correct, <i>n</i> (%)	45 (75)	56 (93.3)		
5	It is crucial for family members to remain at the bedside until death occurs				
	Incorrect, <i>n</i> (%)	48 (80)	58 (96.7)	8.1	0.004
	Correct, <i>n</i> (%)	12 (20)	2 (3.3)		
6	During the last days of life, the drowsiness associated with electrolyte imbalance may decrease the need for sedation				
	Incorrect, <i>n</i> (%)	45 (75)	51 (85)	1.88	0.171
	Correct, <i>n</i> (%)	15 (25)	9 (15)		
7	Drug addiction is a major problem when morphine is used on a long-term basis for the management of pain				
	Incorrect, <i>n</i> (%)	53 (88.3)	9 (15)	64.61	<0.001
	Correct, <i>n</i> (%)	7 (11.7)	51 (85)		
8	Individuals who are taking opioids should also follow a bowel regime				
	Incorrect, <i>n</i> (%)	39 (65)	21 (35)	10.8	0.001
	Correct, <i>n</i> (%)	21 (35)	39 (65)		
9	The provision of palliative care requires emotional detachment				
	Incorrect, <i>n</i> (%)	8 (13.3)	1 (1.7)	4.32	0.038
	Correct, <i>n</i> (%)	52 (86.7)	59 (98.3)		
10	During the terminal stages of an illness, drugs that can cause respiratory depression are appropriate for the treatment of severe dyspnea				
	Incorrect, <i>n</i> (%)	48 (80)	42 (70)	1.6	0.206
	Correct, <i>n</i> (%)	12 (20)	18 (30)		
11	Men generally reconcile their grief more quickly than women				
	Incorrect, <i>n</i> (%)	44 (73.3)	23 (38.3)	14.9	<0.001
	Correct, <i>n</i> (%)	16 (26.7)	37 (61.7)		
12	The philosophy of palliative care is compatible with that of aggressive treatment				
	Incorrect, <i>n</i> (%)	34 (56.7)	15 (25)	12.5	<0.001
	Correct, <i>n</i> (%)	26 (43.3)	45 (75)		
13	The use of placebos is appropriate in the treatment of some types of pain				
	Incorrect, <i>n</i> (%)	45 (90)	59 (98.3)	2.43	0.119
	Correct, <i>n</i> (%)	6 (10)	1 (1.7)		
14	In high doses, codeine causes more nausea and vomiting than morphine				
	Incorrect, <i>n</i> (%)	30 (50)	14 (36.7)	9.19	0.002
	Correct, <i>n</i> (%)	30 (50)	46 (76.7)		

(Continued)

Table 2. (Continued.)

	Control group, <i>n</i> = 60	Intervention group, <i>n</i> = 60	$\chi^2/df = 1$	<i>p</i> -value
15	Suffering and physical pain are synonymous			
	Incorrect, <i>n</i> (%)	49 (81.7)	2.23	0.136
	Correct, <i>n</i> (%)	11 (18.3)		
16	Demerol is not an effective analgesic in the control of chronic pain			
	Incorrect, <i>n</i> (%)	31 (51.7)	9.03	0.003
	Correct, <i>n</i> (%)	29 (48.3)		
17	The accumulation of losses renders burns out inevitable for those who seek work in palliative care			
	Incorrect, <i>n</i> (%)	44 (73.3)	1.2	0.274
	Correct, <i>n</i> (%)	16 (26.7)		
18	Manifestations of chronic pain are different from those of acute pain			
	Incorrect, <i>n</i> (%)	15 (25)	0.79	0.375
	Correct, <i>n</i> (%)	45 (75)		
19	The loss of a distant or contentious relationship is easier to resolve than the loss of one that is close or intimate			
	Incorrect, <i>n</i> (%)	59 (98.3)	1.87	0.171
	Correct, <i>n</i> (%)	1 (1.7)		
20	The pain threshold is lowered by anxiety or fatigue			
	Incorrect, <i>n</i> (%)	38 (63.3)	3.27	0.071
	Correct, <i>n</i> (%)	22 (36.7)		

Paired-sample *t*-test for the impact of the educational program on the participant's knowledge and attitude regarding PPC

A paired-sample *t*-test was conducted to evaluate the impact of the educational program on the participant's knowledge and attitude from time 1 (pre-test) to time 2 (post-test). The results showed that the control group was not statistically different in PPC knowledge to the second time the authors measured knowledge ($t = 0.335$, $df = 59$, $p = 0.739$). Moreover, the results showed no statistically significant change in the control group of nurses in their perceived attitudes toward PPC ($t = 1.10$, $df = 59$, $p = 0.0290$) when measured for a second time. In comparison, the paired samples *t*-test in the intervention group suggested that there was a statistically significant increase in PPC knowledge from pre-test to post-intervention times. Their PPC knowledge at pre-test ($M = 7.92$) was significantly lower than their knowledge after the educational session ($M = 10.18$, $t = 5.71$, $df = 59$, $p < 0.001$), the effect size (Cohen's $D = 0.703$). Interestingly enough, the attitudes of the intervention group of nurses toward the PPC at pre-test ($M = 100$, $SD = 10.95$) was found to be significantly lower than their attitudes after receiving the educational session ($M = 107$, $SD = 12.10$, $t = 5.48$, $df = 59$, $p < 0.001$), highlighting a statistically significant and large effect (Cohen's $D = 0.71$) of the educational session that resulted in a substantial change in the intervention group of nurses' attitudes toward the PPC in general (see Table 4).

Correlation between knowledge and attitude toward PPC among the nurses' control group

Pearson's correlation test (r^2) was used to examine the associations between the nurses' attitudes and knowledge of PPC. The analysis findings suggested that the nurses' pre-test knowledge

correlated significantly and positively with their pre-test attitudes toward PPC ($r^2 = 0.205$, $p < 0.050$). The nurses' attitudes to PPC tended to increase as their knowledge of PPC increased incrementally, too, on average. The nurses' pre-test knowledge correlated significantly and positively with their mean attitudes toward PPC, even after the intervention was administered to a subset of the nurses ($r^2 = 0.22$, $p < 0.050$). For the intervention group, the nurses' post-intervention knowledge and attitudes correlated significantly ($r^2 = 0.323$, $p < 0.010$), which means that after the educational session had been given to some of the nurses, the magnitude of the correlation between the PPC knowledge and attitudes increased from 0.205 to 0.323. This correlation was significant statistically, as well (see Table 5).

Discussion

This is the first research in Jordan to assess the knowledge and attitude of nurses toward PPC and examine the impact of an educational program on pediatric nurses' knowledge and attitudes regarding PPC for children facing life-threatening illnesses or chronic diseases in Jordan. A quasi-experimental design was used in this study. The findings of this study regarding the effect of PPC education program provide healthcare providers in Jordan with evidence-based information, which reflect on their clinical practice as an application of competencies (provider cannot practice what they do not know) and reflect on reducing the suffering on those pediatric children and their families.

The effect of PPC education program on nurses' knowledge

The results of our study show that the educational program significantly affected the knowledge of pediatric nurses in Jordan.

Table 3. Comparison of nurses' post-intervention questions of attitude toward PPC between the two analyzed groups

	Control group	Intervention group	<i>t</i> / <i>df</i>	<i>p</i> -value
	Mean (SD)	Mean (SD)		
1. Giving care to the dying person is a worthwhile experience	4.02 (1.16)	4.50 (0.93)	2.52/112.77	0.013
2. Death is not the worst thing that can happen to a person	2.5 (1.46)	3.63 (1.39)	4.36/118	<0.001
3. I would be uncomfortable talking about impending death with the dying person	4.02 (1.10)	3.82 (1.31)	0.907/118	0.366
4. Caring for the patient's family should continue throughout the period of grief and bereavement	3.62 (1.08)	4.38 (0.96)	4.12/118	<0.001
5. I would not want to care for a dying person	3.07 (1.26)	3.15 (1.27)	0.36/118	0.719
6. The nonfamily caregivers should not be the one to talk about death with the dying person	3.65 (1.27)	2.88 (1.45)	3.08/118	0.003
7. Length of time required to give care to a dying person would frustrate me	3.12 (1.24)	3.23 (1.24)	0.516/118	0.607
8. I would be upset when the dying person I was caring for, gave up hope of getting better	3.77 (1.16)	3.62 (1.22)	0.691/118	0.491
9. It is difficult to form a close relationship with the dying person	2.78 (1.19)	2.48 (1.28)	1.31/117	0.194
10. There are times when death is welcomed by the dying person	3.47 (0.95)	3.72 (1.09)	1.34/118	0.183
11. When a patient asks, "Am I dying?" I think it is best to change the subject to something cheerful	3.58 (1.11)	3.57 (1.21)	0.079/118	0.938
12. The family should be involved in the physical care of the dying person if they want to	3.95 (0.98)	4.43 (1.81)	2.94/113.91	0.004
13. I would hope person I'm caring for dies when I'm not present	3.75 (1.32)	3.58 (1.36)	0.68/118	0.497
14. I am afraid to become friends with a dying person	3.23 (1.31)	3.28 (1.33)	0.21/118	0.836
15. I would feel like running away when the person actually died	3.34 (1.47)	3.48 (1.31)	0.57/117	0.572
16. Families need emotional support to accept behavior changes of a dying patient	3.85 (0.98)	4.32 (0.95)	2.66/118	0.009
17. As a patient nears death, the nonfamily caregiver should withdraw from his/her involvement with the patient	1.82 (0.95)	1.98 (1.30)	0.80/118	0.423
18. Families should be concerned about helping their dying member make the best of his remaining life	4.25 (0.95)	4.50 (0.85)	1.52/118	0.132
19. The dying person should not be allowed to make decisions about his physical care	3.14 (1.36)	2.78 (1.47)	1.36/118	0.178
20. Families should maintain as normal environment as possible for their dying member. Measure in symptom control	3.83 (1.06)	4.33 (0.93)	2.74/118	0.008
21. It is beneficial for a dying person to verbalize his feelings	4.20 (0.95)	4.58 (0.77)	2.43/112.03	0.017
22. Care should extend to the family of the dying person	3.98 (1.00)	4.55 (0.79)	3.44/118	0.001
23. Caregivers should permit dying persons to have flexible visiting schedules	3.72 (1.25)	4.47 (0.77)	3.96/98.10	<0.001
24. Dying person and his family should be in charge decision makers	3.50 (1.23)	4.33 (1.00)	4.10/113.46	<0.001
25. Addition to pain relieving medication should not be a concern when dealing with a dying person	3.33 (1.04)	4.58 (0.79)	7.44/110.11	<0.001
26. I would be uncomfortable if I entered room of a terminally ill person	3.37 (1.23)	3.43 (1.27)	0.29/118	0.771
27. Dying persons should be given honest answers about their condition	3.18 (1.21)	4.48 (0.89)	5.68/108.34	<0.001
28. Educating families about death and dying is not a nonfamily caregivers responsibility	2.63 (1.09)	2.45 (1.25)	0.76/106.81	0.45
29. Family members who stay close to a dying person often interfere with the professionals' job with the patient	3.50 (0.98)	3.87 (1.10)	1.92/118	0.056
30. It is possible for nonfamily caregivers to help patients prepare for death	3.27 (1.10)	4.42 (0.87)	6.32/118	<0.001

Nurses in the intervention group exhibited more knowledge in the PPC questionnaire after the educational program compared with the nurses in the control group ($p = <0.001$), which means that the educational program has a significant positive effect on nurses' PPC knowledge. This was consistent with the results of previous studies. For example, the results of Haut et al. (2012) in Urban (Maryland) and Korzeniewska-Eksterowicz et al. (2013) in Poland showed improvement in the pediatric nurses' knowledge after an educational program. El-Nagar and Lawend

(2013) and Ghoshal et al. (2018) found a significant increase in the nurses' knowledge after an intervention program that consisted of two sessions per week, with each session ranging between 60 and 90 min. This means that the educational intervention had a positive effect on the nurses' knowledge toward PPC, which was consistent with previous studies. These studies, in addition to our study, support the required need to improve educational courses for all nurses working in pediatrics departments to improve their knowledge in this area.

Table 4. Paired samples *t*-test comparing nurses overall attitudes and knowledge score both pre- and post-intervention program for each group of nurses separately

	Mean (SD)	Pre-intervention			Post-intervention	
		Mean (SD)	Mean difference (95% CI)	Effect size Cohen's <i>D</i>	<i>t</i> /df ^a	<i>p</i> -value
Control Group, <i>n</i> = 60						
PPC Knowledge	6.88 (2.26)	7.03 (2.41)	-0.15 (-1.050; 0.747)	0.043	0.335/59	0.739
Attitudes toward PPC	95.88 (7.90)	95.65 (8.03)	0.233 (-0.204; 0.670)	0.137	1.10/59	0.29
Intervention Group, <i>n</i> = 60						
PPC Knowledge	7.92 (1.99)	10.18 (2.00)	-2.27 (-3.061; -1.472)	0.703	5.71/59	<0.001
Attitudes toward PPC	100.00 (10.95)	107.62 (12.10)	-7.62 (-10.396; -4.837)	0.710	5.48/59	<0.001

^aPaired samples *t*-test, Cohen's *D*: <https://www.simplypsychology.org/effect-size.html>.

Table 5. Bivariate Pearson's correlations (*r*) between nurses' attitudes and knowledge toward PPC, *N* = 120

	Pre-test knowledge	Post-knowledge	Pre-test attitudes
Nurses Post Program PPC Knowledge score	0.027		
Pre-test attitudes to PPC score	0.205*	0.076	
Post attitudes to PPC score	0.219*	0.323**	0.697**

*Correlation is significant at the 0.05 level (two-tailed).

**Correlation is significant at the 0.01 level (two-tailed).

The effect of PPC education program on nurses' attitudes

Our study found that the intervention group of nurses exhibited a more positive attitude toward PPC after the educational intervention program compared with the nurses in the control group in Jordan ($p = 0.001$). This was consistent with a study carried out by Bouri et al. (2017) in Athena, who confirmed a significant positive effect of PPC training in the intervention group's attitude, which was dealing with the deceased. Also, many studies supported the positive effect of an educational intervention program on nurses' attitudes toward PPC regardless of the study design (Haut et al., 2012; El-Nagar and Lawend, 2013; Korzeniewska-Eksterowicz et al., 2013; Ghoshal et al., 2018). Haut et al. (2012) used a one group pre-test-post-test design and confirmed the positive effect of educational programs on nurses' knowledge and attitudes. Similarly, Korzeniewska-Eksterowicz et al. (2013) assessed the healthcare students' knowledge by using an anonymous questionnaire design and confirmed the positive effect of the pilot education program on student knowledge. El-Nagar and Lawend (2013) used a nonequivalent quasi-experimental design in Egypt and found that nurses lack knowledge toward PPC and witnessed the positive effect of educational intervention on nurses' knowledge and attitudes toward PPC. Two studies used a special type of educational program to evaluate the intervention in students' level knowledge and attitudes toward PPC and found the same positive results (Carman et al., 2016; Lewis et al., 2016). Carman et al. (2016) used didactic content that consisted of discussion and simulation for the experimental group ($n = 62$) of preclinical undergraduate nursing students and found improved attitude scores. Lewis et al. (2016) used an experimental study to determine the effect of educational programs on the attitudes

of nursing and medical students toward PPC and found a positive effect of their intervention. Using this evidence, it appears that the current study's interventions were too brief to generate an attitude change. Changing attitudes is not a simple or fast process. Attitudes are an evaluation of people, groups, things, and ideas, and have an affective, cognitive, and behavioral component (Bohner and Dickel, 2011). It is worth mentioning that no previous studies opposed the findings of our study. These studies, in addition to our study, support the required need to improve educational courses for all nurses working in pediatrics departments to enhance their attitudes in this area.

The relationship between knowledge and attitude toward PPC

Our study found that there was a significant positive relationship between baseline knowledge and baseline attitude ($p < 0.05$). Likewise, the knowledge correlated with the attitude at baseline, the magnitude of relation was higher post-intervention, and the attitude at baseline correlated with the post-intervention attitude. These results were consistent with previous studies of Chen and others (2013) conducted to explore the nurses' beliefs and attitudes working in the NICU to care for newborns in Taiwan. The result showed that nurses lacked knowledge regarding PPC. Similarly, Matusi and Braun (2009) showed a positive relationship between nurses' personal attitudes toward death and their attitudes toward providing end-of-life care to patients.

Many studies confirmed the relationship between the knowledge and attitude toward PPC (Haut et al., 2012; El-Nagar and Lawend, 2013; Korzeniewska-Eksterowicz et al., 2013; Myers, 2017; Ghoshal et al., 2018). By the mean, nurses' knowledge was correlated with attitude, and both were positively affected by the educational intervention. It is worth mentioning that Myers' (2017) study in the mid-Atlantic region, which used special educational interventions (lecture, lecture with case study, and lecture with simulation) to measure the effect on student nurses' knowledge and attitude toward PPC. Myers found that the three interventions were effective, with no significant differences between them in participants' scores.

Implications for nursing education and practice

The findings of this study regarding the effect of PPC educational programs provide healthcare providers with evidence-based information that reflects on their clinical practice as an application of competencies (providers cannot practice what they do not know) and reflects on reducing the suffering of the patients and their

families. These interventions — the inclusion of education within routine care — can be translated to health care and lead to a significant change in the usual hospice and palliative care in Jordan. The current study could help the administrators of clinical areas to accomplish their objectives by implementing the educational program that was used in this study in their education programs. They are accountable for enabling nurses to apply the content of this PPC program in their clinical practice to enhance their ability to care for pediatric patients and their families.

Limitations

Our study faced some limitations, which may impact on the generalizability of the study finding, like the quasi-experimental research design, which lacks randomization and the small sample size, the authors tried to resolve this limitation by used two groups, the intervention and control group, and use the pre-/post-test design, which strengthened the study finding. The interruption to the educational interventional program was a limitation for our study, and we tried to resolve it by identifying the education session times as nurses preferred and appropriate for the nurse's work time. Moreover, the Coronavirus pandemic events caused limitations on our data collection for the control group, which we resolved by continuing data collection using an online questionnaire.

Conclusion

With the increased need for PPC services for pediatrics with chronic, serious illness and the confirmed positive effect of PPC services for children in need of it and their families, improving the nurses' knowledge and attitude toward PPC has become necessary. Based on the result of this study, the authors found strong evidence of the effectiveness of the PPC educational program when it comes to improving the nurse's knowledge and attitude toward PPC services and offer us an effective educational program.

Author contributions.

All listed authors meet the authorship criteria and that all authors agree with the content of the manuscript.

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References

- Abuhammad S, Muflih S, Alzoubi KH, *et al.* (2021a) Pediatrics palliative care from nursing and PharmD perspectives. *Pediatrics International* **12**(3), 23–29.
- Abuhammad S, Muflih S, Alzoubi KH, *et al.* (2021b) Nursing and PharmD undergraduate students' attitude toward the "do not resuscitate" order for children with terminally ill diseases. *Journal of Multidisciplinary Healthcare* **14**, 425.
- Abuhammad S, Muflih S, Alazzam S, *et al.* (2021c) Knowledge of pediatric palliative care among medical students in Jordan: A cross-sectional study. *Annals of Medicine and Surgery* **64**, 102246.
- Balkin EM, Sleeper LA, Kirkpatrick JN, *et al.* (2018) Physician perspectives on palliative care for children with advanced heart disease: A comparison between pediatric cardiology and palliative care physicians. *Journal of Palliative Medicine* **21**(6), 773–779.
- Bohner G and Dickel N (2011) Attitudes and attitude change. *Annual Review of Psychology* **62**, 391–417.
- Bouri M, Papadatou D, Koukoutsakis P, *et al.* (2017) The impact of pediatric palliative care training on the death attitudes of health professionals. *International Journal of Caring Sciences* **10**(2), 34–40.
- Carman MJ, Sloane R, Molloy M, *et al.* (2016) Implementation of a learning bundle to promote end-of-life education for prelicensure nursing students. *Journal of Hospice and Palliative Nursing* **18**(4), 356–363.
- Chen CH, Huang LC, Liu HL, *et al.* (2013) To explore the neonatal nurses' beliefs and attitudes towards caring for dying neonates in Taiwan. *Maternal and Child Health Journal* **17**(10), 1793–1801. doi:10.1007/s10995-012-1199-0
- Chong PH, De Castro Molina JA, Teo K, *et al.* (2018) Paediatric palliative care improves patient outcomes and reduces healthcare costs: Evaluation of a home-based program. *BMC Palliative Care* **17**(1), 1–9. doi:10.1186/s12904-017-0267-z
- da Silva AF, Issi HB, Motta M, *et al.* (2015) Palliative care in paediatric oncology: Perceptions, expertise and practices from the perspective of the multidisciplinary team. *Revista Gaúcha de Enfermagem* **36**(2), 56–62. doi:10.1590/1983-1447.2015.02.46299
- Detsyk OZ, Zolotarova ZM, Stovban IV, *et al.* (2018) Awareness of PPC among health care workers. *Wiadomosci lekarskie (Warsaw, Poland: 1960)* **71**(3 pt 1), 574–578.
- Elearnicpcn.org (2020) *International Children's Palliative Care Network: Elearning*. Available at: <https://www.elearnicpcn.org/> (accessed 3 June 2020).
- El-Nagar S and Lawend J (2013) Impact of palliative care education on nurses' knowledge, attitude and experience regarding care of chronically ill children. *Journal of Natural Sciences Research* **3**(11), 94–103.
- Fitch MI, Fliedner MC and O'Connor M (2015) Nursing perspectives on palliative care 2015. *Annals of Palliative Medicine* **4**(3), 150–155.
- Frommelt M (1991) The effects of death education on nurses' attitudes toward caring for terminally ill persons and their families. *American Journal of Hospice and Palliative Medicine* **8**(5), 37–43.
- Gans D, Kominski GF, Roby DH, *et al.* (2012) Better outcomes, lower costs: Palliative care program reduces stress, costs of care for children with life-threatening conditions. *Policy Brief (UCLA Center for Health Policy Research)* **22**, 67–73.
- Ghoshal A, Talawadekar P, Palleri A, *et al.* (2018) Impact of educational training in improving skills, practice, attitude, and knowledge of healthcare workers in PPC: Children's palliative care project in the Indian state of Maharashtra. *Indian Journal of Palliative Care* **24**(4), 411.
- Guimarães TM, da Silva LF, Santo FHE, *et al.* (2016) Palliative care in pediatric oncology in nursing students' perception. *Escola Anna Nery - Revista de Enfermagem* **20**(2), 261–267. doi:10.5935/1414-8145.20160035
- Haut CM, Michael M and Moloney-Harmon P (2012) Implementing a program to improve pediatric and pediatric ICU nurses' knowledge of and attitudes toward palliative care. *Journal of Hospice and Palliative Nursing* **14**(1), 71–79. doi:10.1097/NJH.0b013e318236df44
- Khraisat O, Alakour N and Neil L (2017) Pediatric end-of-life care barriers and facilitators: Perception of nursing professionals in Jordan. *Indian Journal of Palliative Care* **23**(2), 199.
- Korzeniewska-Eksterowicz A, Przysto Ł, Kędzińska B, *et al.* (2013) The impact of PPC education on medical students' knowledge and attitudes. *The Scientific World Journal* **2013**, 23–29.
- Lewis C, Reid J, McLernon Z, *et al.* (2016) The impact of a simulated intervention on attitudes of undergraduate nursing and medical students towards end of life care provision. *BMC Palliative Care* **15**(1), 67.
- Mastroianni C, Piredda M, Taboga C, *et al.* (2015) Frommelt attitudes toward care of the dying scale form B: Psychometric testing of the Italian version for students. *OMEGA-Journal of Death and Dying* **70**(3), 227–250.
- Matsui M and Braun KL (2009) Japanese Americans' death attitudes and preferences for end-of-life care. *Journal of Hospice and Palliative Nursing* **11**(6), 353–361.
- Myers AM (2017) *The Effects of Simulation and Case Study Methods of Instruction on Undergraduate Nursing Students' Knowledge and Attitudes on Palliative Care (Doctoral dissertation)*. Catholic University of America.
- O'Shea ER, Wallace M, Griffin MQ, *et al.* (2011) The effect of an educational session on pediatric nurses' perspectives toward providing spiritual care. *Journal of Pediatric Nursing* **26**(1), 34–43.

- Polit DF and Beck CT** (2013) Essentials of nursing research seventh edition appraising evidence for nursing practice. *Journal of Chemical Information and Modeling*. doi:10.1017/CBO9781107415324.004
- Ross M, McDonald B and McGuinness J** (1996) The palliative care quiz for nursing (PCQN): The development of an instrument to measure nurses' knowledge of palliative care. *Journal of Advanced Nursing* **23**(1), 126–137. doi:10.1111/j.1365-2648.1996.tb03106.x
- Terzioglu F and Uslu Sahan F** (2015) Palliative care to the cancer patient: Turkish nurses' perspectives. *Journal of Palliative Care and Medicine* **S5** (January). doi:10.4172/2165-7386.1000s5004
- Thompson LA, Knapp C, Madden V, et al.** (2009) Pediatricians' perceptions of and preferred timing for PPC. *Pediatrics*. doi:10.1542/peds.2008-2721
- WHO** (2018a) *WHO | Palliative Care*. Geneva: The World Health Organisation. <https://doi.org/http://www.who.int/mediacentre/factsheets/fs402/en/>.
- WHO** (2018b) Children: Reducing mortality. *Weekly Epidemiological Record = Relevé épidémiologique hebdomadaire* **89**(38), 418–420.
- Younge N, Smith PB, Goldberg RN, et al.** (2015) Impact of a palliative care program on end-of-life care in a neonatal intensive care unit. *Journal of Perinatology* **35**(3), 218–222. doi:10.1038/jp.2014