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Effectiveness of an Educational Program on Nurses' Knowledge and Practice toward Delirium Assessment of Patients at Critical Care Units in Baghdad Teaching Hospitals

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Abstract:
Objective(s): *The study aims to determine the effectiveness ofthe nursing education program on nurses' knowledge and practice toward delirium assessment at critical Care Units in Baghdad Teaching Hospitals.*
Methodology: *A quasi-experimental design study was conducted in Baghdad Teaching hospitals from the period 25th November 2019 to 13th August 2020. Non- probability (purposive) sample of (80) nurses who are working in the Intensive care units and High Dependency Unit andselected from the Directorate of Medical City, Nursing Home Hospital, Ghazi AL Hariri Teaching Hospital, Baghdad Teaching Hospital. The sample is divided into two groups; (40) nurses (the study group) are exposed to the educational program and (40) nurses (control group) are not exposed to the program.The researcher constructed educational program and instruments in order to reach the aims of the present study. The program deal with 5 main domains related to delirium assessment.The reliability of the instrument was determined through the use of the test-retest approach forthe knowledge test and inter-observer for nurses' practice. While the instrument validity determined through content validity by a panel of experts.Data were analyzed through the use of Statistical Package for Social Sciences (SPSS) version (21) by the application of descriptive statistics (frequency, percentage, arithmetic mean, standard deviations) and inferential statistic (chi – square, independent sample t-tests, paired t-test and one way ANOVA).*
Results: *The current study revealed that nurses who participated in educational program demonstrated a high level of knowledge than the control group, in relation to delirium assessment include: information about delirium, delirium assessment, sedation assessment, delirium prevention, and delirium management.Regarding nurses' practice toward delirium assessment,the educational program had a positive effect on nurses' practice as compared with a control group in relation to all delirium assessment domains.*
Recommendations: *Based on the findings of the present study, the researcher recommends establishing training courses, seminars, andaperiodic performance assessment for nurses regarding delirium assessment in the intensive care units and it is recommended for future research conduction.*

Keywords: *Effectiveness, Educational Program, Knowledge, Practice, Delirium Assessment.*

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Introduction

Intensive care unit patients (ICUs) carry an elevated risk of multiple complications, including delirium, a disorder marked by a sudden loss of consciousness, impaired concentration, and decreased cognitive[1, 2].In fact, in the Intensive Care Unit (ICU), delirium incidence inpatients on mechanical ventilation ranges from (60 to 80 %) [3, 4].

Delirium also called the acute confusional condition, is a neurological syndrome that occurs in a brief period of time and fluctuates during the day.It presents as hyper-active, hypo-active, or mixed; and impaired sleep period.Hyper-active delirium is marked byrestlessness, agitation, and attempts to cut tubes and lines and affects only a few ICU patients (<5%).Hypo-active delirium is characterized by flat effects, withdrawal, apathy, diminished reactivity, and lethargy.Mixed delirium occurs when patients swing between the two.Routine monitoring is therefore required to diagnose mixed and hypo-active delirium, as they are often invisible or undetected [5].

Delirium is caused by a medical condition, an overdose of a drug, or withdrawal in addition to side effects of the medication, as well as neuro-cognitive illness.Prevention and early diagnosis should be the focus of the efforts[6].

Delirium patients are at risk of increased time spent on mechanical ventilation and length of stay with ICU [7, 8]. Early detection and management of delirium can, therefore, result in a reduction in its occurrence, the length of stay in the ICU (LOS), the overall length of stay in the hospital, and the cost of care[9].

Delirium has consequences for the family of patients, health professionals, especially nurses, and the use of hospital resources. Greve et al. address the various adverse effects associated with delirium-developing ICU patients, for example, prolonged mechanical ventilation, increased mortality, increased hospital and ICU stay, high risk of self-extubation, and catheter self-removal [10].

In addition, delirium can affect the patient socially through cognitive developmental impairments even after hospital discharge such as memory, attention, focus, and motor functions [11, 12].Other important consequences of delirium are the difficulties that patients face when returning to work, at home, as well as improving as time passes [12].These negative effects of delirium can be reduced by applying preventive strategies and early delirium recognition in ICU patients up to (30 %)[11, 12].

Hence, prompt delirium identification potentially reduces the risk of these complications, increases patient safety, and lowers health care costs. To reduce the incidence, intensity, and duration of delirium in ICU patients, ICU nurses can adopt evidence-based interventions such as spontaneous awakening and breathing tests in intubated patients, early mobility and physical therapy, and daily reorientation of patients.[13]The highest levels of alertness are recommended for delirium detection because delirium is commonly undiagnosed [14].

However, health care professionals, including nurses, are often under or misdiagnose delirium in the intensive care unit. In addition, reliable and validated tools are not being used to Screen for the presence of delirium [15]. According to The Society of Critical Care Medicine (SCCM); patients should be routinely monitored for the ICU delirium [16]. In fact, nurses' inability to recognize delirium is primarily caused by a lack of knowledge of symptoms, risk factors, and delirium prevention measures [17]. Lack of knowledge about delirium will result in a lack of patient-centered care and difficulties in providing professional nursing care [18].

Research studies show that ICU nurses can play a key role by providing a comprehensive education concerning theearly recognition, assessment, and prevention of delirium [19, 17, 11]. The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) is a reliable and validated screening tool for ICU delirious patients with a high level of sensitivity and specificity[16, 20].Nurses show that they have the skills needed to use the (CAM-ICU) effectively if they have obtained proper education [17].

In 2012, the American College of Critical Care Medicine updated the 2002 pain control, sedation, and delirium recommendations include routine delirium monitoring in adult ICU patients by the use of an accurate and effective delirium monitoring methods involve (CAM-ICU) confusion assessment method inthe ICU and Richmond Agitation Sedation Scale (RASS).

In terms of ICU delirium managementof adult ICU patients, early mobilization, and non-pharmacological treatments are required to minimize delirium incidence and length [16]. The findings of these evidenced-based protocols highlighted the value of following a protocol based on evidence for minimizing the harmful consequences of delirium in the ICU's.

Methodology

A quasi-experimental design study was conducted in Baghdad Teaching hospitals from the period 25th November 2019 to13th August 2020. Non- probability (purposive) sample of (80) nurses who are working in the Intensive care units including the intensive Care Units and High Dependency Unit.The sample is divided into two groups; (40) nurses (the study group) are exposed to the educational program and (40) nurses (control group) are not exposed to the program, The sample was selected from the Directorate of Medical City, Nursing Home Hospital, Ghazi AL Hariri Teaching Hospital, Baghdad Teaching Hospital ICU and HDU departments was included.The researcher constructed educational program and instruments through the review of available literature, and interview with physiciansin order to reach the aims of the present study. The program deal with 5 main domains related to delirium assessment and the questionnaires consist of three parts; **The first part** is concerned with the demographic data for nurses includes (7) items; which as (gender, age, Academicnursing

qualifications, years of experience in nursing, years of experience in ICUand HDU, Training courses in theintensive care unit, and automatically renew of knowledge regarding the field of work).

The second part is concerned with the assessment of the nurses' knowledge about delirium assessmentThe knowledge test was designed by the researcher based on an extensive review of the literature and relevant studies(Detroyer et al., 2016; Hare et al., 2008). It composed of (30) multiple-choice questions with 4 alternatives and consists of 5 domains, which include: general information about delirium, delirium assessment, sedation assessment, delirium prevention, and delirium management.

The third part is to assess the nurses' practices about delirium assessment. The observational checklistwas designed by the researcher based on an extensive review of the literature and relevant studies (Devlin et al., 2018; Öztürk & Aydinb, 2017; Karabulut & Aktas, 2015). It is composed of (15) items, scored by applicable or non-applicable, and covered three domains include: delirium assessment, delirium prevention, and delirium management. The content validity of the educational program and the instruments is obtained from a panel of (13) experts from different scientific branches having at least 5 years' experience in their field of work. Thereliability of the instruments was determined through the use of the test-retest approach forthe knowledge test and inter-observer for nurses` practice. Data were analyzed through the use of Statistical Package for Social Sciences (SPSS) version (21) by the application of descriptive statistics (frequency, percentage, arithmetic mean, standard deviations) and inferential statistic (chi-square, independent sample t-tests, paired t-test and one way ANOVA).

Ethical considerations

The Institutional Review Board (IRB) at the University of Baghdad, College of Nursing approved the study to be conducted. The study protocol meets both the global & the Committee on Publication Ethics (COPE) standards of respecting human subjects' rights.

Results

Table (1): Distribution of the ICU and HDU Nurses by Demographic Characteristics of the Study and the Control Groups

Demographic Characteristics	Variables	Study Group (n=40)		Control Group (n=40)		C.S. & Sig.
		F	%	F	%	
Age group (Years)	20-30	22	55.0	25	62.5	X^2=0.73 P=0.694 N.S
	31-40	13	32.5	12	30.0	
	41 and above	5	12.5	3	7.5	
	Mean (SD)	30.32 ±7.30		30.02 ±7.15		
Gender	Male	15	42.5	22	55.0	χ^2=2.46 p=0.116 N.S
	Female	25	57.5	18	45.0	
Years of experience in nursing	Less than 1 year	8	20.0	8	20.0	χ^2=0.337 p=0.95 N.S
	1-5	15	37.5	14	35.0	
	6-10	10	25.0	9	22.5	
	More than 10	7	17.5	9	22.5	
Years of experience in ICU	Less than 1 year	11	27.5	14	35.0	χ^2=0.564 p=0.905 N.S
	1-5	15	37.5	14	35.0	
	6-10	9	22.5	8	20.0	
	More than 10	5	12.5	4	10.0	

n=number of samples, F=frequency, %= percentages, C.S. = comparison of significance, χ^2 =Chi square test, Sig = significant at p-value= <0.05, ICU= Intensive Care Unit, N.S=non significant

Table (1) displays the mean age for participants in the study group is 30.32 ±7.30; more than half of participants age between 20-30-years (n = 22; 55.0) and the least those who age 41and above-years (n = 5; 12.5%). For the control group, the mean age is 30.02 ±7.15; more than half (n = 25; 62.5%) of participants age between 20-30-years, followed (n = 12; 30.0%) by those who age 31-40-years, and (n = 3; 7.5%)of those who age 41and above-years. Concerning gender, more than half, 25; (57.5%) of participants in the study group are females compared to males their count was (n = 15; 42.5%). For the control group, more than half (n = 22; 55.0%) of the participants are males while the females are (n = 18;

45.0%). Regarding the years of experience in nursing; more than a third of participants in the study and control group have 1-5-years 15; (37.5%), (n = 14; 35.0%) respectively, and the least (n = 7; 17.5%) of those who have more than 10 years` experience in the study group. While in the control group (n = 8; 20.0%) of those who have less than one year. Concerning the years of experience in ICU more than a third (n = 15; 37.5%) of the participants in the study group have 1-5-years, and (n = 5; 12.5%) of those who have more than 10 years` experience For the control group, participants who have less than one year and 1-5-years are equally distributed (n = 14; 35.0%), and those who have more than 10 years (n = 4; 10.0%).

Table (2): Distribution of the ICU and HDU Nurses by professional Characteristics of the Study and the Control Groups

Demographic Characteristics	Variables	Study Group (n=40)		Control Group (n=40)		C.S. & Sig.
		F	%	F	%	
Academic nursing qualifications	Nursing Preparatory school	4	10.0	3	7.5	χ^2=0.601 p=0.896 N.S
	Diploma degree	15	37.5	17	42.5	
	Bachelor's degree	19	47.5	19	47.5	
	Master degree	2	5.0	1	2.5	
Education or training courses regarding critical care unit	Yes	35	87.5	34	85.0	χ^2=0.105 p=0.74 N.S
	No	5	12.5	6	15.0	
Number of training courses	1-5	29	82.9	29	85.3	χ^2=0.764 p=0.782 N.S
	6-10	6	17.1	5	14.7	
The location of training courses	Inside Iraq	26	74.3	27	79.4	χ^2=0.29 p=0.865 N.S
	Outside Iraq	1	2.9	1	2.9	
	Both	8	22.9	6	17.6	
Automatically renew of knowledge regarding the field of work	Yes	35	87.5	35	87.5	χ^2=0.0 p=1 N.S
	No	5	12.5	5	12.5	
Sources of self-learning	The internet (social media)	23	65.7	24	68.6	χ^2=0.801 p=0.961 N.S
	Library (books)	3	8.6	3	8.6	
	Scientific journals	9	25.7	8	22.9	

Table (2) displays the academic nursing qualifications, less than half (n = 19; 47.5%) of the study and the control group hold a bachelor's degree, followed by those who hold a diploma degree (n = 15; 37.5%), and (n = 17; 42.5%) respectively.

With respect to education or training courses regarding the critical care unit, the majority (n = 35; 87.5%) of the study and (n = 34; 85. 0%) of the control groups have received education or training courses. While the participants who have not received education or training courses in the study and control group are (n = 5; 12.5%, n = 6; 15.0 %) respectively.

Concerning the number of training courses (n = 29; 82.9%) of the study and (n = 29; 85.3%) of the control groups have attended 1-5 training courses.Regarding the location of training courses, more than half (n = 26; 74.3%) of the study group have attended training courses in Iraq only. For the control group, mostly (n = 27; 79.4%) have attended training courses in Iraq, while (n = 1; 2.9%) of the study and control group who have attended training courses outside Iraq only are equal. Concerning the knowledge of the work field, the majority (n = 35; 87.5%) of the study and control groups are automatically renewing their knowledge regarding the field of work.

With respect to the sources of self-learning, more than half (n = 23; 65.7%) of the study group and (n = 24; 68.6%) of the control group uses the internet (social media) as a source of self-learning, While the participants who read books are equally distributed in the study and control group (n = 3; 8.6%).

Lastly, this table reveals that there are no statistically significant associations between the study and the control groups related to age, gender, years of experience in nursing, years of experience in ICU, academic nursing qualifications, participation in training courses, number, and location of training courses, knowledge regarding work field, and sources of self-learning.

Table (3): Comparison of Pretest and Post-test Knowledge Scores between the Study and the Control Groups
n= number of samples, df= degree of freedom=39, HS = Highly significant, NS = Non-significant, SD =Standard deviation, Sig. = Significance

Knowledge domains (Number of questions)	Periods	Study group (n=40)		Control group (n=40)	
		Mean ± SD	t-test, p-value & Sig.	Mean ± SD	t-test, p-value & Sig.
1-General information about delirium (6 questions	Pre	8.05 ± 2.70	t=7.874 p=0.000 HS	9.35 ± 4.50	t=0.691 P=0.493 NS
	Post	10.95 ± 3.58		8.5 ± 4.50	
2-Delirium assessment (5 questions)	Pre	6.22 ± 2.13	t=10.774 P=0.000 HS	6.25 ± 2.13	t=0.892 P=0.378 NS
	Post	9.25 ± 1.77		6.05 ± 2.00	
3- Sedation assessment (5 questions)	Pre	6.32 ± 2.15	t=6.053 P=0.000 HS	6.35 ± 2.17	t=0.495 P=0.623 NS
	Post	8.67 ± 3.38		6.25 ± 2.16	
4- Delirium prevention (6 questions)	Pre	7.8 ± 2.74	t=6.185 P=0.000 HS	7.77 ± 2.70	t=1.403 P=0.169NS
	Post	10.32 ± 2.70		7.42 ± 2.54	
5- Delirium management (8 questions)	Pre	10.32 ± 3.52	t=6.205 P=0.000 HS	10.37 ± 3.57	t=0.251 P=0.803 NS
	Post	13.17 ± 3.79		10.27 ± 4.69	

Table (3) shows that a statistically significant difference in participants' knowledge between the pretest and posttest related to all domains include (general information about delirium, delirium assessment, sedation assessment, delirium prevention, and delirium management) at (p-value = 0.000) in the study group. While the control group the table shows no statistically significant difference in participants' knowledge between the pretest and post-test on all domains.

Table (4): Comparison of pretest &post-test Practice Scores between the Study and the Control Groups

Practice checklist domains (number of items)	Periods	Study group (n=40)			Control group (n=40)		
		Mean ± SD	t-test	p-value & Sig.	Mean ± SD	t-test	p-value & Sig.
1- Delirium assessment (3 items)	Pre	3.12 ± 0.33	54.289	0.000 HS	3.02 ± 0.15	1.253	0.089 NS
	Post	6 ±0			3.12 ± 0.33		
2- Delirium prevention (21 items)	Pre	25.05 ±6.89	33.511	0.000 HS	22.45 ±4.58	1.509	0.139 NS
	Post	41.5 ±1.45			22.05 ±3.67		
3- Delirium	Pre	11.67 ±2.00	45.846	0.000	11.27 ± 1.07	1.955	0.058

management (11 items)	**Post**	21.55 ±1.56		**HS**	11.15 ± 0.85		**NS**

n=number of samples, df= degree of freedom=39, HS = Highly significant, NS = Non-significant, SD =Standard deviation, Sig. = Significance

Table (4) shows that there is statistically highly significant difference in participants' practices between the pretest and post-test to all domains related to (delirium assessment, delirium prevention, and delirium management) at (p-value = 0.000) in the study group.While the control group shows no statistically significant difference in participants' practices between the pretest and post-test in all domains.

Table (5): Comparison of Pre-test and Post-test Knowledge and Practices between the Study (n=40) and Control Groups (n=40)

Items	Periods	Group	Mean± SD	t-test	P-value	Sig.
Knowledge	**Pre**	**Control**	38.92±3.15	0.305	0.761	**NS**
		Study	38.72±2.68			
	Post	**Control**	38.50±3.38	13.310	0.000	**HS**
		Study	52.37±5.65			
Practice	**Pre**	**Control**	36.75±2.08	5.064	0.000	**HS**
		Study	39.85±3.26			
	Post	**Control**	36.22±2.27	82.182	0.000	**HS**
		Study	69.05±1.10			

n= number of samples, df= degree of freedom= 78, Sig. = Significance, NS= non-significant, HS = Highly significant, SD =Standard deviation

Table (5) shows no statistically significant difference in participants' knowledge between study and control groups in the pretest period at (p-value = 0.761), while there is a high statistically significant difference in the post-test at (p-value = 0.000). Furthermore, there is a statistically high significant difference in participants' practices between groups in the pretest and post-test periods at (p-value = 0.000).

Table (6): Association between Nurses' Knowledge and Demographic Characteristics for the Study Group at Post-Test

Demographic characteristics	Knowledge test		Practice checklist	
	Test	P-value&(Sig)	Test	P-value&(Sig)
Age Group (Years)	**F**=0.463	0.938 **(NS)**	**F**=1.617	0.192 **(NS)**
Gender	**t**=56.542	0.000 **(HS)**	**t**=351.885	0.000 **HS**
Years of experience in nursing	**F**=1.009	0.478 **(NS)**	**F**=.342	0.848 **(NS)**
Years of experience in ICU	**F**=0.723	0.740 **(NS)**	**F**=.144	0.964 **(NS)**
Academic nursing qualifications	**F**=0.693	0.767 **(NS)**	**F**=.201	0.936 **(NS)**
Education or training courses regarding critical care unit	**F**=0.439	0.949 **(NS)**	**F**=0.438	0.781 **(NS)**
Number of training courses	**F**=0.428	0.950 **(NS)**	**F**=0.635	0.641 **(NS)**
The location of training courses	**F**=1.532	0.183 **(NS)**	**F**=0.422	0.792 **(NS)**
Automatically renew of knowledge regarding the field of work	**F**=0.977	0.506 **(NS)**	**F**=0.754	0.562 **(NS)**
Sources of self-learning	**F**=0.667	0.779 **(NS)**	**F**=0.437	0.781 **(NS)**

Sig. =significance, HS = highly significant, NS = Non-significant, SD =Standard deviation, F= ANOVA: analysis of variance, t = t-test

Table (6) shows no statistically significant differences in participants' knowledge and practice for the study group at post-test and all variables of demographic and professional characteristics except for gender there is statistically significant difference at (p-value = 0.000).

Discussion

Part I: Discussion of the Nurses' Demographic Characteristics in the Control and Study Groups.

Regarding demographic characteristics that are presented in table [1,2], the data showed comparability between the study and the control group with respect to specific demographic characteristics.Analysis of such characteristics reveals that more than half of participants in both study and control groups are within the age group of (20-30) years old and mean age was (30.32 ±7.30) and(30.02 ±7.15) respectively. The researcher believes that the large numbers of nurses in the age of twenties are due to the employment of new nursing graduates mostly college and diploma degree levels of education.Concerning gender, the number of females in the study groups was more than males. As for the control group, males were more compared to females.

This outcome is consistent with that achieved in the United States [13] with the aim of designing, implementing, and reviewing a critical care nursing educational program that provided a protocol for the prevention and management of delirium in adult ICU patients, In addition to enhancing nurses' confidence, comfort and compliance by the use of a standardized delirium and intervention care package assessment process, Where the study consisted overwhelmingly of females (82%)**[13].**

A cross-sectional study conducted in India [21] that aimed to assess the ICU nurses' knowledge regarding identification and management of delirium among ICUs patients also reported most (66%) of ICU staff nurses were females while (34%) were males. While a contradictory study finding was investigated in Jordan [22] to determine the critical care nurses' level of knowledge and management competencies related to caring for ICU patients with delirium. The results reported that 60% of participants were of the male gender**.** This demonstrates that females have the same opportunities for males to take place in a hard-working area.

Regarding the years of experience in nursing, more than athird of participants in the study and control group have 1-5-years (37.5%, 35%) respectively, followed by those who have 6-10-years (25%, 22.5%) respectively. And the years of experience in ICU; the present study shows more than a third of the participants in the study group have 1-5-years (37.5%), followed by those who have less than one year (27.5%). For the control group, participants who have less than one year and 1-5-years are equally distributed (35%). This finding is consistentwith the evidence are available in the study that reportedhalf of the participants 5 years or less of ICU nursing experience **[13].**

Regarding academic nursing qualifications, (85%) of the study group and (90%) of the control group holds a bachelor's degree and a diploma degree. These findings are consistent with that obtained in the United States [23] that aimed to assess the effectiveness of multimodal training intervention for nurses in the medical intensive care unit in order to improve their knowledge and skills on the recognition of delirium and delirium, where most of the participants reported their highest degree in nursing as a Bachelor in Nursing (56 %) with 1 to 5 years of experience in the critical care unit (59 %).

This finding is also consistent with a study that found the most participants displayed their highest degree in nursing as a Bachelor's degree (78%), followed by an associate degree in nursing (12%) **[13].** This finding could be explained as that the officials in the Iraqi Ministry of Health emphasized to mainly recruit nurses who hold a bachelor's degree to work in critical care centers and units including the ICU and HDU.

Concerning the number of training courses regarding the critical care unit, the results revealed that the majority (87.5%) of the study and (85%) of the control group have attended 1-5 training courses in Iraq, followed by those who have 6-10 courses.

These findings were conflicting with a study reported only 10% of ICU nurses had received special education in critical care nursing**[22].**Another conflicting finding from a descriptive correlation study that aims in order to assess the degree of delirium-related awareness, understanding, and practice and to recognize their association in nurses employed in general hospitals, where the results show that 56.3% of respondents reported having experience in delirium-related education, while 94.7% believed that delirium-related education was required **[24].**

Lastly, these result consisted evidence is available in the study that aims to assess the knowledge of nursing and medical personnel, identify and control intensive care unit delirium and determine potential challenges associated with intensive care unit delirium screening using a validated screening method, where only 44% of the nurses had never received any training/ education on ICU delirium**[25].**The researcher believes that health care managers and practitioners should respond to the task of helping nurses develop the requisite expertise and skills to care for patients with delirium and bring evidence-based training programs into the practice of critical care nursing.

Concerning the knowledge of work field, the majorities of participants have automatically renewed their knowledge regarding the field of work and equally distributed in the study and control groups

With respect to the sources of self-learning, more than half of participants in the study and control use the internet (social media) as a source of self-learning, followed by those who read scientific journals.

Part II: Discussion of Effectiveness of the Educational Program on ICU and HDU Nurses' Knowledge toward Delirium Assessment in Pre and Post-Tests.

Through data analysis of nurses` knowledge inthe table (3) by five domains to assess theeffectiveness of an educational program on nurses` knowledge toward delirium assessment, prevention, and management for the study and control groups; The results related to nurses` knowledge showed that nurses who participated in the educational program demonstrated a highly significant increase in their knowledge (p =0.000) when compared in the pre and post-tests related to all domains (general information on delirium, delirium assessment, sedation assessment, delirium prevention, and delirium management). While the results of nurses' knowledge who were assigned in the control group showed no statistically significant difference in the pre and post-tests related to all five knowledge domains. This is consistent with that study achieved in Jordan was the study and the control groups had some knowledge of delirium at baseline, but the difference was not statically significant. After the educational program, the mean score of the intervention group was statistically significant (p=0.000). **(22).**

Another quasi-experimental study in the United States supportsevidence that is available in the study that noted the study and the control groups had some knowledge of delirium at baseline but the difference was not statically significant. After the educational program, the mean score of the intervention group was statistically significant (p=0.000) **(26).**This study demonstrated that the use of the educational programs to critical care nurses can improve nurses' knowledge of delirium prevention and management.

These findings are also supported by another study in which the total average percentage of pre-educational knowledge questionnaire questions answered correctly was (70% ± 12.8%), and (95% ± 6.9%) in the post-educational knowledge questionnaire. The statistical analysis of the average knowledge scores revealed a substantial difference between the groups (P=0.000) **(13).**These findings integrate the need for critical care nurses in education programs to effectively assess, prevent, and manage delirium patients and improve overall patient outcomes.

With regard to the disparity in theknowledge of the participants between the study and the control groups in the post-test period, there were statistically significant differences (p =0.000) in participants' knowledge across all domains.

This is consistent with that accomplished in Australia in a pre-test / post-test time-series design cluster randomized controlled trial was performed to assess delirium knowledge (DK) and delirium recognition (DR) over three time points. This research showed that there are statistically significant variations (p=0.001) in delirium knowledge between the intervention group and the control group **(27).**

A further pre\post-intervention research study design supports these findings in the United States to evaluate the extent of delirium knowledge of ICU nurses at a single extent I trauma hospital, both before and after a targeted educational intervention. The findings revealed a large difference (p=0,000) in pre-intervention and post-intervention. This study suggests that educational intervention has a positive influential effect on the level of delirium knowledge of ICU nurses **(28).**

Part III: Discussion of Effectiveness of the Educational Program on ICU and HDU Nurses' practice toward Delirium Assessment in Pre and Post-Test.

Concerning the difference in participants' practices between the intervention and the control groups in the pre and post-practice checklist in the table (4), the practices of participants in the study group related to (delirium assessment, delirium prevention, and delirium management) was noticeably improved (p=0.000) as compared with the control group.

This result is supported by a study conducted in the United which aimed to examine potential obstacles in delirium assessment for critical care nurses and the impact of education on enhancing their knowledge and practice. The results demonstrated that there was a significant correlation between receiving education on delirium and better knowledge and practice scores **(29).** This finding indicates the positive influence of the educational program in enhancing such practices.

Part IV: Comparison between Nurses' Knowledge and Practice toward Delirium Assessment in Pre and Post-Tests.

Table (5) shows no statistically significant variances in nurses' knowledge between groups during the pre-test period (p =0.761) while there is a highly statistically significant difference in the post-test period (p=0.000) between the study and control groups. In addition, there is a statistically significant difference in nurses' practices between pre-test and post-test periods (p=0.000) in both groups.

This finding consisted of evidence that is available in the study that illustrates the nurses with better knowledge of ICU delirium were more likely in their management to provide a higher degree of successful nursing practice**(22).**

Part V: Discussion of the Relationship between Nurses' Knowledge and Practice with Demographic Characteristics and Some Variables.

The current research showed no statistically significant discrepancies between the knowledge of the participants during the study group's post-test time and all demographic variables except gender (p=0.000) inthe table (6). The results of

the current research study also reported no significant difference in delirium knowledge when considering years of experience or professional education background.

In a study to assess knowledge on intensive care unit delirium among nurses working in thecritical care unit, Where ICU delirium knowledge showed a negative correlation with nursing age, education level and awareness of delirium-related nurses, but there was a positive association between work experience (p=0.010) and information-related in-service education (p=0.001) **[30].**

Regarding the differences in participants' practices between groups in terms of some variables table (6), there were no statistically significant differences in participants' practices among the age groups, the educational level, ICU experience, years of nursing experience, and training courses, except for gender (p-value=0.000). These results were consistent with that obtained in the in the United states were overall and knowledge-based mean scores differed significantly (P<.001) before and after the intervention with no correlation between demographic groups and score differences **[23].**

Recommendations

1. Implementation of a regular nurses training session on delirium assessment to address the deficits found and promote best practice.
2. Participation of ICU nurses in seminars and conferences inside and outside the country to increase their expertise and scientific knowledge.
3. Periodic performance assessment of ICU nurses acceptability to identify the shortages that affect the provision of care in intensive care units.
4. Offer more wages and benefits to nurses who work in intensive care units than those who work less effortful in other departments.
5. Promote a multidisciplinary approach to improving practice, involving, and investing all staff roles.
6. Develop a formal written policy on the assessment of ICU delirium, including the assessment tools to be used and frequency.
7. Conduct focus groups of nurses each week to explore the issues raised, especially the barriers to delirium assessment, in greater depth.
8. Further research is recommended for the assessment, prevention, and management strategies of delirium in critical care units.

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