Assiut Scientific Nursing Journal
http://asnj.journals.ekb.eg
http://www.arabimpactfactor.com
http://olddrji.lbp.world/indexedJournals.aspx
DOI: 10.21608/ASNJ.2022.115040.1295

Impact of Psycho Educational Program on Nurses' Knowledge and Practices Regarding Care of Patients with Delirium

Saleh Omar Abdullah[1], Alaa El Din Mohamed Darweesh[2] & Naglaa Abd El Megied Mohammed[3]
[1.] Assistant Lecturer in Psychiatric and Mental Health Nursing at Faculty of Medicine & Health Science, Hodeidah University, Yemen
[2.] Professor Psychiatry of Medicine, Faculty of Medicine, Assiut University, Egypt
[3.] Professor of Psychiatric and Mental Health Nursing, Faculty of Nursing, Assiut University, Egypt

Abstract:
Delirium is one of the most commonly encountered problems among patients in the Intensive Care Units (ICUs) resulting in increased duration of mechanical ventilation and length of stay. Nurses' knowledge and practice had an important impact in improving the quality of healthcare and preventing delirium in patients. **The study aimed:** To evaluate the impact of psycho-educational program on nurses' knowledge and practices regarding care of patients with delirium. **Subjects & Method:** A quasi-experimental research design was utilized in this study, conducted at intensive care units at AL-Thawra Hospital – Yemen. The study incorporated a convenience sample of (60) nurses working in the ICUs. Data collection tools included demographic and work-related characteristics data, nurses' knowledge questionnaire of delirium and observational checklist for assessment of nurses' practices caring for delirium patients. **Results:** There is a marked improvement in ICU nurses mean scores of their knowledge and practices regarding caring patients with delirium immediately after program implementation and follow up. **Conclusion:** The psycho-educational program has positive effect on nurses knowledge and practices regarding caring for patients with delirium after implementing the educational program. **Recommendations:** Periodic monitoring of nurses' knowledge and practices to evaluate the level of nurses' practice about delirium and construct program according to their needs.

Keywords: Delirium, Knowledge, Practices, ICU nurses & Psycho Educational Program.

Introduction:
Delirium is defined as a disruption of awareness resulting inability to sustain or shift attention. This change in awareness occurs over a short period of time, fluctuates throughout the day and is not always linked to pre-existing dementia **(World Health Organization, 2018).** Internationally, several studies found that the delirium develops in 20% - 50% of the patients not receiving mechanical ventilation and in 60% - 80% of ICUs patients receiving mechanical ventilation. The ICU's delirium is three times higher reintubation rate and more than 10 stay days in the hospital **(Tuble et al., 2015; Jeon et al., 2016; Horacek et al., 2016; Ibrahim et al., 2018 & Smonig et al., 2019).**

Several authors have identified that nurses lack the necessary knowledge and skills to identify delirium effectively and are poorly engaged in delirium screening practices. It is evident from the literature that nursing staff working in ICUs internationally, are inconsistent and poorly engaged in recognition of delirium. The barriers identified in the literature include; lack of time, lack of knowledge related to delirium, difficulty assessing patients who are intubated and sedated, the perceived complexity of screening tools, lack of feedback on performance and lack of physician support **(Akande, 2016; Devlin et al., 2018 & Tsang et al., 2019).**

In Egypt, **Elfeky & Ali, 2013** revealed that in-spite of having many years of experience in working with critically ill patients, all ICU nurses (100%) ranked delirium assessment as the fourth priority after level of conscious, pain assessment, handling agitation and caring for devices. More than half of the studied nurses (54.2%) never assessed delirium and 100% of nurses never received training about assessing and handling delirium. While, **Abusaad et al., (2017),** found that, the majority of nurses have poor knowledge about delirium particularly for its definition, causes and its management. Also, more than half of them have a negative attitude regarding delirium and the majority of them have unsatisfactory practice. The most common barriers for delirium screening were the absence of tools and difficulties of delirium screening for patients on a ventilator at ICUs Effective strategies or type of educational interventions for nursing staff in improving both knowledge, skills and confidence in recognizing delirium are interactive sessions, didactic lectures, web-based nurse training, case scenarios, scripted unfolding case studies, team objective structured clinical encounter (TOSCE), in-service education and

use of resource nurses for training **(Middle, Miklancie, 2015; Coyle et al., 2018& Lee et al., 2020).**

Significance of study

Delirium is the most common neuropsychiatric condition in hospital, 15% to 25% on general medical wards, up to 60% on surgical wards – critical care 80% in the sickest ventilated patient **(Halter., 2018).** Delirium is a concern for ICU nurses because the early recognition of patients with developing delirium requires the assessment of patients at risk for this syndrome. Baseline neurological assessment of ICU patients is often limited **(Ribeiro et al., 2016).**

The medical and nursing records at the intensive care units at Al-Thawra Hospital had no statistical data related to this health problem over the past few years. Also, in Yemen, there has been no clear evidence identified in ICU nurses' knowledge and practices. Therefore, the current study could be helpful in service planning and providing evidence base to improve nursing care of delirious patients in ICUs.

The enhancement of nurses' knowledge and skills regarding delirium is of significant importance in improving performance and positively impact patient outcomes and prevent the occurrence of negative events. Special studies should be performed to overcome the gaps or defects by constructing and applying a well instructional program based on defined needs and observation.

Aims of study: The current study aims to evaluate the impact of psycho-educational program on nurses' knowledge and practices regarding care of patients with delirium.

Research hypothesis:

To fulfill the aim of this study, the following research hypothesis was formulated:

H: Psycho-educational intervention program will have a positive effect on intensive care unit nurse's knowledge and practices regarding delirium.

Subjects and Method:-

Research design: A quasi-experimental research design was utilized in this study.

Study setting: This study was conducted in the Intensive Care Units at Al-Thawra Hospital, Al-Hodeidah City, in Yemen. There are two Intensive Care Units, general ICU and Coronary Care Unit (CCU). The general ICU consists of 3 rooms; every room contains 5 beds with 5 cardiac monitors and 3 mechanical ventilators; approximately 90 cases admit monthly. While the CCU consists of 2 rooms, every room contains 4 beds with 4 cardiac monitors and 3 mechanical ventilators, approximately 60 cases admit monthly. The nurse-patient ratio was nearly 1:2.

Study subjects: A convenient sample of 60 nurses working at ICU who are providing direct care during three shifts (morning, evening and night) for critically ill patients in the previous settings were included in the study. Nurses were distributed as follows: 40 nurses from general ICU and 20 from CCU who meet inclusion criteria.

The inclusion criteria are:

- Nurses on duty.
- At least one year of experience in ICU.
- Qualification for nursing practice either by diploma (after secondary school) or Bachelor.

Tools of data collection:

The following tools were used to collect data of the current study:

Tool I: Demographic and work-related characteristics data tool:

This included nurse age, sex, residence, level of education, marital status, unit type, duration of work in ICU, working time, working hours/day and attendance of previous training program about delirium.

Tool II: Nurses' knowledge questionnaire of delirium:

This tool was constructed and developed by the researcher after reviewing the relevant literature **(Hare et al., 2008; Jang & Yeom., 2018).** It is a self-administered questionnaire that takes about 30 minutes, was used to assess the level of intensive care nurses' knowledge about delirium.

This tool consists of (60) questions covering the knowledge about of delirium in ICU; it is divided into seven main parts included definition, incidence, subtypes, assessment, risk factors, clinical manifestations and management & nursing care of delirium.

Scoring system: Each correct answer will have (1) mark, incorrect or missed answer have (0). Total score (60 marks) was be classified into three levels as follows: Poor knowledge if the score is less than 60% (<36), fair knowledge if the score is 60% to less than 75% (36-<45) and good knowledge if the score is 75% and above (45-60)**.**

Tool III: Observational checklist for assessment of nurses' practices caring for delirium patients:

This tool was constructed and developed by the researcher after reviewing the relevant literature **(Oh., 2018 & National Institute for Health & Care Excellence., 2019).** It was used to assess the practices of intensive care nurses toward patients suffering from delirium.

The observation was carried out by the researcher for 60 minutes for each nurse. This tool consists of (98) items; it is divided into twelve main parts, included assessment of delirium, establish/maintain normal fluid balance, establish/maintain aeration and oxygenation, provide nutritional support, maintain circulation, effective communication, pain

management, skin care, sensation, safety, prevention of infection and sleep/wake pattern.

Scoring system: The score of each item was allotted as "done" which takes (1) grade and not properly done or not done takes (0) grade. Total scoring (98 grades) was be classified into three levels as follows: Poor practice if the score is less than 60%, (<58.8), fair practice if the score is 60% to less than 75% (58.8-<73.5) and good practice if the score is 75% and above (73.5-98)**.**

Procedure: The procedure was carried out through three phases; the preparatory phase, implementing phase and evaluating phase.

Preparatory phase

Official permission to collect data and implement the educational program was obtained from the Dean of the Faculty of Nursing, Assuit University and director of Al-Thawra Hospital, Al-Hodeidah, Yemen.

The tools of the study were developed by the researcher after reviewing literature. They were revised and corrected by supervisors.

Validity:

Validity was done for all tools by five experts from faculty members in the nursing and medical field from Assuit University. Three of them were from psychiatric nursing and two from psychiatric medicine were from different academic categories, i.e., professor and assistant professor, to confirm the accuracy and relevance of the information and tools.

Pilot study: The pilot study was carried out on 10 nurses who were later excluded from the main study subjects to test and evaluate the clarity, feasibility and applicability of the research tools and to estimate the time needed to collect data. The required modifications were conducted.

Reliability:

The reliability was carried out using the Cronbach alpha coefficient test to nurses' knowledge questionnaire of delirium and observational checklist for assessment of nurses' practices caring for delirium patients (r= 0.84, & 0.92) respectively.

Implementation phase:

Data of the current study were collected during the period from beginning Jun 2019 till the end of October 2019. Data were collected in three days every week for each setting mentioned before; in the morning, evening and night shift. Researcher interviewed each nurse to explain the steps of the research and its aims. The researcher choice of the individual interview is easier to avoid disturbance in the system of work that occurs because of the group interview.

The program was planned and designed based on reviewing the related literature and the needs assessment of nurses in this study through (pre-test). At the end of the program, ICU nurses might acquire the necessary knowledge and skills regarding caring for patients with delirium.

The educational program was implemented through twelve sessions, covered in twelve hours approximately, seven theoretical hours were contained knowledge about delirium such as definition, subtypes, incidence, risk factors, clinical manifestation, assessment, differentiate between the delirium, dementia and depression and management of the delirium and five practical hours was contained practices regarding caring patient with delirium such as tools used to assess delirium in ICU (confusion assessment method- ICU & intensive care delirium screening checklist) prevention and nursing intervention for critically ill patients suffering from delirium.

The educational program sessions were implemented during four weeks, three days every week in the Nutritional hall at Al-Thawra Hospital, in Yemen. The nurses were divided into four groups. Each group consisted of fifteen nurses to avoid a shortage of nurses in the work setting and also because of the difference in shifts.

Evaluation phase:

The nurses were interviewed and assessed immediately after the implementation of sessions to evaluate the outcomes of the educational program and three months later for the follow-up to evaluate the knowledge and skills achievement using the same pre-assessment tools except demographic and work-related characteristics data tool.

Ethical considerations:

The research proposal was approved from Ethical Committee in the Faculty of Nursing, official permission to collect data and implement the educational program was obtained from the Dean of the Faculty of Nursing, Assiut University and director of Al-Thawra Hospital, Al-Hodeidah - Yemen. The purpose of this study was explained to all participants and informed them that the information and data obtained would be confidential and used only for the purpose of the study. Written informed consent was taken from the participants through document dating before implementing the training program.

Statistical design:

Data were entered and analyzed with the **IBM SPSS version 20.0** software. The data were tested for normality using the Anderson-Darling test and for homogeneity variances prior to further statistical analysis. Categorical variables were described by **number and percent** (N, %), where continuous variables described by mean and standard deviation **(Mean, SD)**. **Chi-square test** and fisher exact test used to compare between categorical variables where compare between continuous variables by **t-test**. Pearson correlation coefficient used to assess the association between continuous variables. **A two-tailed p< 0.05** was considered statistically significant.

Results:

Table (1): Demographic and some important work-related variables of the studied nurses (N=60)

Variables	Studied nurses (N=60)	
	No	%
Age groups: Mean ± SD (range)	**29.18±4.25 (22-40)**	
• < 25 year	13	21.7
• 25-30 years	28	**46.7**
• >30 years	19	31.7
Sex		
• Male	23	38.3
• Female	37	**61.7**
Residence		
• Rural	14	23.3
• Urban	46	**76.7**
Level of education		
• Bachelor of nursing	27	45.0
• Diploma	33	**55.0**
Marital Status		
• Single	29	**48.3**
• Married	27	45.0
• Divorced	4	6.7
Types of Unit		
• General ICU	40	**66.7**
• Coronary Care Unit	20	33.3
Duration of work in ICU: Mean ± SD (range)	**5.47±3.15 (1-15)**	
• < 5 years	37	**61.7**
• 5 – 10 years	20	33.3
• > 10 years	3	5.0
Working time		
• Morning	15	25.0
• Evening	18	30.0
• Night	27	**45.0**
Working hours/day: Mean ± SD (range)	**9.82±2.76 (6-16)**	
• 6 – 8 hours	27	45.0
• > 8 hours	33	**55.0**
Previous training program about delirium		
• Yes	00	00
• No	60	**100.0**

Table (2): The mean score of ICU nurses knowledge regarding delirium at pre, post-implementation & follow up evaluation of the educational program (N=60)

Items	(#)Max Score	Pretest	post	Follow up	Comparison			
		Mean±SD	Mean±SD	Mean±SD	P^1	P^2	P^3	P^4. value
Definition of delirium	1	0.58±0.50	0.97±0.18	0.92±0.28	**<0.001****	**<0.001****	0.429	**<0.001****
Incidence of delirium	1	0.53±0.50	0.92±0.28	0.88±0.32	**<0.001****	**<0.001****	0.632	**<0.001****
Subtypes of Delirium	4	1.20±1.13	3.77±0.46	3.48±0.65	**<0.001****	**<0.001****	0.54	**<0.001****
Assessment of delirium	7	2.38±1.37	6.47±0.79	6.13±1.10	**<0.001****	**<0.001****	0.102	**<0.001****
Risk factors of delirium	18	9.95±2.84	17.67±0.71	16.97±1.56	**<0.001****	**<0.001****	**0.47***	**<0.001****
Clinical manifestations of delirium	11	6.52±2.43	10.85±0.40	10.57±0.74	**<0.001****	**<0.001****	0.298	**<0.001****
Management and nursing care of delirium	18	8.55±2.84	17.57±0.74	17.00±1.19	**<0.001****	**<0.001****	0.91	**<0.001****
Total Knowledge Score	60	**29.72±7.00**	**58.20±1.87**	**55.95±3.64**	**<0.001****	**<0.001****	**0.009****	**<0.001****

ANOVA t-test

** Statistically significant difference (p<0.05)*

*** Highly statistically significant difference (p<0.01)*

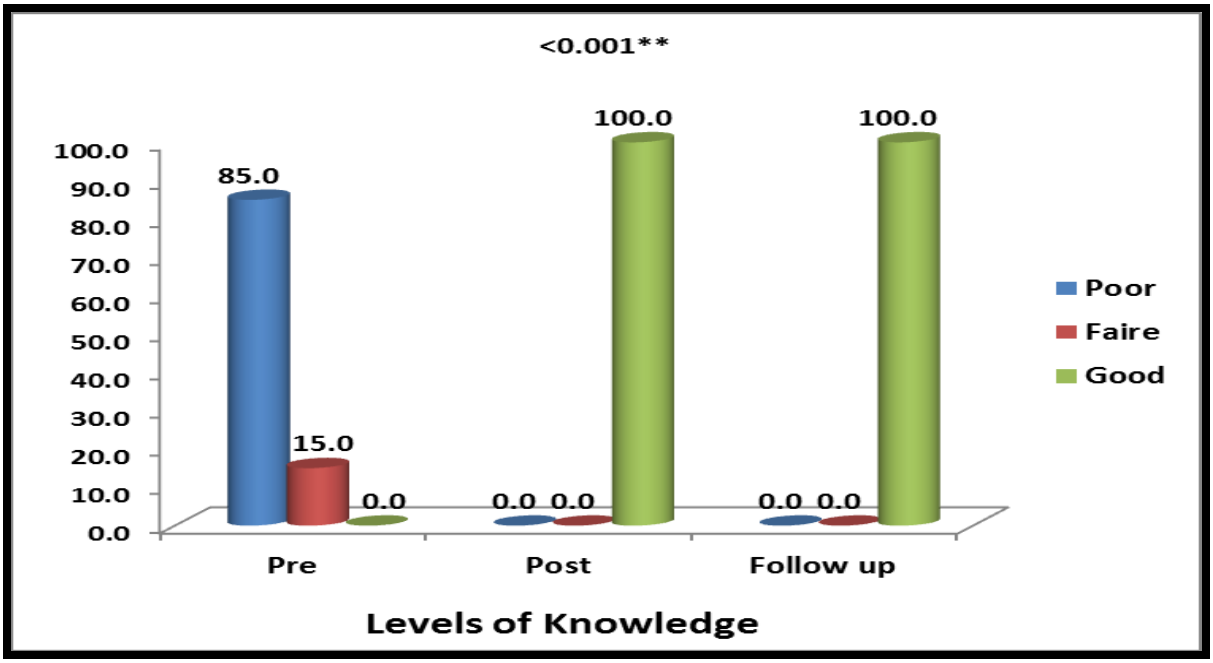
(#)Minimum score = 0

P^1: pre vs. post

P^2: pre vs. Follow up

P^3: post vs. Follow up

P^4:value: pre vs. post vs. Follow up



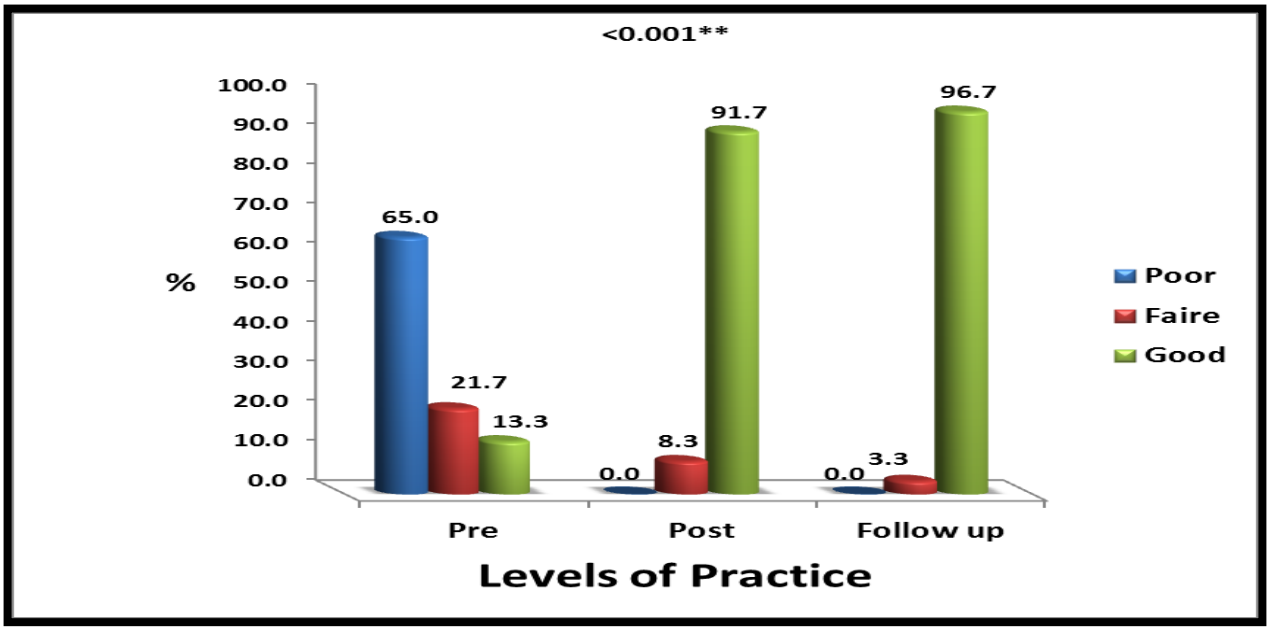
Chi-square test
*** Highly statistically significant difference (p<0.01)*

Figure (1): Comparison of levels of knowledge among ICU nurses about delirium at pre, post-implementation and follow up evaluation of the educational program (N=60)

Table (3): The mean scores of ICU nurses practices regarding delirium at pre, post-implementation & follow up evaluation of the educational program (N=60)

Items	(#)Max Score	Pretest	Post	Follow up	Comparison			
		Mean±SD	Mean±SD	Mean±SD	P^1	P^2	P^3	$P^{4.}$ value
Assessment of delirium.	8	1.10±0.84	6.98±1.99	5.90±2.74	**<0.001****	**<0.001****	**0.004****	**<0.001****
Establish/maintain normal fluid balance	9	7.32±2.13	9.00±0.00	8.55±1.72	**<0.001****	**<0.001****	0.121	**<0.001****
Establish/maintain aeration and oxygenation	9	5.40±1.58	8.43±1.28	8.10±0.80	**<0.001****	**<0.001****	0.149	**<0.001****
Provide nutritional support	12	6.13±2.64	11.47±1.11	10.73±0.90	**<0.001****	**<0.001****	**0.022***	**<0.001****
Maintain circulation	7	4.97±2.18	6.92±0.33	6.70±0.85	**<0.001****	**<0.001****	0.385	**<0.001****
Effective communication	10	4.05±2.20	9.55±1.02	8.77±1.16	**<0.001****	**<0.001****	**0.006****	**<0.001****
Pain management	9	3.45±2.93	8.62±0.92	7.87±0.95	**<0.001****	**<0.001****	**0.028***	**<0.001****
Skin care	4	1.63±1.52	3.83±0.46	3.40±0.94	**<0.001****	**<0.001****	**0.027***	**<0.001****
Sensation	10	4.77±3.24	9.52±1.11	8.58±1.29	**<0.001****	**<0.001****	**0.017***	**<0.001****
Safety	5	2.93±1.46	4.82±0.57	4.50±0.65	**<0.001****	**<0.001****	0.078	**<0.001****
Prevention of infection	9	4.27±2.69	8.60±0.96	7.77±1.17	**<0.001****	**<0.001****	**0.011***	**<0.001****
Sleep/wake pattern.	6	2.37±1.96	5.67±0.68	5.15±0.82	**<0.001****	**<0.001****	**0.029***	**<0.001****
Total Practice Score	**98**	48.38±20.20	93.40±7.99	**86.02±6.30**	**<0.001****	**<0.001****	**0.002****	**<0.001****

ANOVA t-test
** Statistically significant difference (p<0.05)*
*** Highly statistically significant difference (p<0.01)*
(#)Minimum score = 0
P^1: pre vs. post
P^2: pre vs. Follow up
P3: post vs. Follow up
P4:value: pre vs. post vs. Follow up



Chi-square test *** Highly statistically significant difference (p<0.01)*

Figure (2): Comparison of levels of practice among ICU nurses about delirium at pre, post-implementation and follow up evaluation of the educational program (N=60)

Table (4): Correlation between total knowledge and practices score at pre, post-implementation & follow up evaluation of the educational program among ICU nurses (N=60)

Correlations	Total practice score					
	Pre		Post		Follow up	
Total knowledge score	r	p	r	P	r	p
	-0.220	0.091	0.312	**0.015***	0.258	**0.047***

Pearson correlation * *statistically significant correlation (p<0.05)*

Table (5): Relationship between demographic, work-related variables and mean knowledge scores at pre, post-implementation & follow up evaluation of the educational program among ICU nurses (N=60)

Variables	N	Knowledge Score			P. value
		Pre	Post	Follow up	
		Mean±SD	Mean±SD	Mean±SD	
Age groups					
• < 25 year	13	29.23±11.01	58.85±0.69	56.38±2.79	0.954
• 25-30 years	28	28.46±5.05	58.54±1.79	56.11±3.79	
• >30 years	19	31.89±5.84	57.26±2.21	55.42±4.02	
Sex					
• Male	23	28.22±8.46	58.57±1.83	57.13±1.84	0.946
• Female	37	30.65±5.86	57.97±1.88	55.22±4.26	
Residence					
• Rural	14	28.29±8.29	58.21±2.11	55.14±4.15	0.715
• Urban	46	30.15±6.61	58.26±1.81	56.20±3.48	
Level of education					
• Bachelor of nursing	27	30.52±5.85	57.67±2.32	55.96±3.55	0.722
• Diploma	33	29.06±7.85	58.64±1.27	55.94±3.91	
Marital Status					
• Single	29	29.45±7.18	58.24±1.96	56.76±3.51	0.842
• Married	27	30.19±7.15	58.15±1.81	55.81±3.14	
• Divorced	4	28.50±5.97	58.25±2.06	51.00±4.55	

Variables	N	Knowledge Score			P. value
		Pre	Post	Follow up	
		Mean±SD	Mean±SD	Mean±SD	
Types of Unit					
• General ICU	40	30.08±7.60	58.23±1.89	56.13±3.60	0.765
• Coronary Care Unit	20	29.00±5.74	58.15±1.87	55.60±3.78	
Duration of work in ICU					
• < 5 years	37	28.43±7.64	58.68±1.42	56.03±3.60	0.859
• 5 – 10 years	20	32.4±4.70	57.55±2.16	55.80±3.94	
• > 10 years	3	26.00±7.00	56.67±3.21	53.00±3.00	
Working time					
• Morning	15	32.67±4.12	57.27±2.40	55.13±4.58	0.982
• Evening	18	28.94±7.29	58.28±1.96	57.33±1.91	
• Night	27	28.59±7.79	58.67±1.24	55.48±3.80	
Working hours/day					
• 6 – 8	27	31.26±4.70	58.26±1.77	56.00±4.31	0.778
• > 8	33	28.45±8.30	58.15±1.97	55.91±3.05	

Table (6): Relationship between demographic, work-related variables and mean practices score at pre, post-implementation & follow up evaluation of the educational program among ICU nurses (N=60)

Variables	N	Practice Score			P. value
		Pre	Post	Follow up	
		Mean±SD	Mean±SD	Mean±SD	
Age groups					
• < 25 year	13	43.92±24.92	96.15±1.95	87.53±4.37	0.894
• 25-30 years	28	49.96±19.05	93.79±8.21	85.32±6.61	
• >30 years	19	48.11±19.06	90.95±9.67	86.00±7.00	
Sex					
• Male	23	52.17±19.02	94.83±6.07	86.39±5.73	0.331
• Female	37	46.03±21.18	92.51±8.94	85.78±6.69	
Residence					
• Rural	14	48.43±21.92	91.5±10.71	82.85±9.60	0.459
• Urban	46	48.37±20.22	93.98±7.00	86.98±6.11	
Level of education					
• Bachelor of nursing	27	48.56±21.22	92.44±8.34	85.81±6.46	0.927
• Diploma	33	48.24±20.22	94.18±7.73	86.18±6.26	
Marital Status					
• Single	29	50.31±19.75	94.79±6.53	86.41±6.51	0.999
• Married	27	46.44±20.66	92.26±8.83	85.70±6.06	
• Divorced	4	47.50±28.35	91.00±12.00	85.25±7.85	
Types of Unit					
• General ICU	40	45.53±23.97	93.60±7.32	86.83±4.85	0.996
• Coronary Care Unit	20	54.10±8.12	93.00±9.38	84.40±8.41	
Duration of work in ICU					
• < 5 years	37	47.00±21.99	93.97±7.30	85.54±6.09	0.561
• 5 – 10 years	20	49.30±18.41	92.20±9.68	86.50±7.09	
• > 10 years	3	59.33±13.01	94.33±3.06	88.67±2.52	
Working time					
• Morning	15	36.53±12.80	89.67±10.65	85.33±4.95	0.175
• Evening	18	53.83±19.77	94.78±6.58	86.33±6.29	
• Night	27	51.33±22.21	94.56±6.68	86.19±7.11	
Working hours/day					
• 6 – 8	27	49.48±16.70	92.11±10.00	85.37±6.19	0.428
• > 8	33	47.49±23.27	94.45±5.82	86.55±6.43	

Table (1): This table shows that the mean age of the studied nurses is (29+4.24) years; the highest percent (46.7%) aged 25 to 30 years old and 37 (61.7%) were females. Most of the sample (76.7) were living in the urban area, 33 (55%) had a diploma and 29 (48.3) were single. The studied sample included 40 nurses (66.7%) were working at general ICU, 37 (61.7%) working for less than five years with mean years (5.47+3.15), 27(45%) worked during the night shift, and 33 (55%) works for more than eight hours daily with mean hours (9.82+2.76). All the studied nurses (100%) did not attend a previous delirium training program.

Table (2): shows that a significant increase in the mean score of total knowledge immediately post-implementation of the educational program (pre 29.72±7.00, immediately post 58.20±1.87) and significant increase maintained at follow up evaluation (55.95±3.64). There was highly statistically significant increase in the mean score of sub-items of ICU nurses knowledge immediately post-implementation and follow up evaluation of the educational program (P=<0.001).

Figure (1): Classification of ICU nurses according to their levels of knowledge. This figure reveals that, at pretest ICU nurses with poor knowledge represent (85.0%) of the sample. However, post-implementation and follow up evaluation of the educational program; ICU nurses with good knowledge represent (100.0%) of the studied sample. There were highly statistically significant differences (P=<0.001).

Table (3): Shows that a significant increase in the mean scores of total practice immediately post-implementation of the educational program (pre 48.38±20.20, immediately post 93.40±7.99) and significant increase was maintained at follow up evaluation (86.02±6.30). There was a highly statistically significant increase in the mean scores of sub-items of ICU nurses practice immediately post-implementation and follow up evaluation of the educational program (P=<0.001).

Figure (2): Classification of ICU nurses according to their levels of practice. This figure reveals that, at pretest ICU nurses with poor practice represent (65.0%) of the sample. While at post-implementation and follow up evaluation of the educational program; ICU nurses with good practice represent (91.7% & 96.7%) respectively of the studied sample. There were highly statistically significant differences (P=<0.001).

Table (4): Shows that, there is negative and non-statistically significant correlation between total knowledge score and total practices score at pre-implementation. While there is a positive and statistically significant correlation between total score of knowledge and total score of practices at post-implementation and follow up evaluation of the educational program (r= 0.258 & 0.312 with p-value 0.015 & 0.047) respectively.

Table (5): Shows that, there are no statistically significant differences among demographic, work-related variables and mean knowledge score at pre, post-implementation & follow up evaluation of the educational program among ICU nurses.

Table (6): Reveals that, there are no statistically significant differences among demographic, work-related variables and mean practice score at pre, post-implementation & follow up evaluation of the educational program among ICU nurses.

Discussion:

Delirium is a medical emergency that needs immediate attention from staff. Therefore, identification and assessment of delirium are needed for appropriate interventions can be implemented. The interventions help to resolve the delirium and return the patient to a state of mental and physical equilibrium **(McKean, 2017 & Ghaeli et al., 2018).** Previous studies had shown that several nursing interventions could significantly reduce the incidence of delirium and are highly effective in improving the management of delirium among older people. Providing nurses with the necessary knowledge and skills can be an effective way of improving the care of older people in hospitals **(Weheida et al., 2018).** It is a worldwide notion that reported in many studies that ICU nurses did not receive enough training about delirium. Lack of in-service training programs that are very important in improving the quality of care regarding patients with delirium may be the main factor.

The present study showed improvement of nurses' knowledge with a significant increase in the mean score of total knowledge after program implementation and at follow up after 3 months. These results support that, need-based training is effective in enhancing knowledge regarding caring patients with delirium and the use of in-service educational program enables studied nurses to solve the problem through clinical training. The In-service educational program was a stimulus for them to gain necessary information about that case problem and present new strategies to solve it and to connect theoretical learning and real clinical problems during the educational intervention, all aspects related to delirium present in In-service education followed by training.

This improvement of nurses' knowledge is reported by many other previous studies **(Ali et al., 2012; Park & Gu, 2013; Kim & Lee, 2014; Varghese et al., 2014; Van De Steeg et al., 2015; Padilla, 2016;**

Abusaad et al., 2017 & Lieow et al., 2019) who revealed that total mean score nurses knowledge improved after program implementation. Also, there was statistically significant higher knowledge in the post-intervention program compared with the pre-intervention program of nurses.

In the same context; this result agrees with **Gesin et al., (2012)** who found that there was a significant increase in the mean score of ICU nurses knowledge immediately after implementation of the educational program and significant increase was maintained at follow up evaluation regarding delirium. Thus; the planned teaching program is effective in increasing the knowledge on delirium.

The implementation of the educational program had a great effect on nurse's knowledge. This was proved by the high statistical significant differences in all tested sub-items of knowledge before and after implementing the program. These results are in agreement with **Younis & Abo Elfetoh, (2014) & Morsy et al., (2015),** who reported that there was a statistically significant difference between the mean pre and post-test scores of nurses' knowledge after the educational program.

The present study showed improvement of nurses' practices with a significant increase in the mean score of total practices after program implementation and follow up after 3 months.

This improvement of nurses' practices was reported by many authors as **(Morita et al., 2006; Devlin et al., 2008; Park & Gu, 2013; Kim & Lee, 2014; Varghese et al., 2014; Younis & Abo Elfetoh, 2014; Van De Steeg et al., 2015; Rawson et al., 2017; Oh, 2018; & Lieow et al., 2019)**. They revealed that total mean score nurses practice improved after program implementation. Also, there was a statistically significant difference in the mean of nurses' total practice scores before and after the educational program.

According to the studies conducted by **(Gesin et al., 2012; Middle & Miklancie, 2015; & Lieow et al., 2019)**, in-service education was effective in improving nurses' skills. The education and training intervention studies of ICU delirium mostly attempted to improve nurses' skills and recommended that in-service education can help to enhance nurses' skills of delirium in ICUs.

The current study showed that all the nurses indicate a remarkable increase in the mean sub-items of ICU nurses practice scores toward patients suffering from delirium, in which immediately after implementation and at follow up evaluation scores were higher than a pre-implementation assessment of the educational program.

In this respect, previous studies conducted by **Park & Gu, (2013) & Oh, (2018)**, classified in which sub-items of practice regarding delirium, as the assessment of risk factors and nursing intervention of delirium showed that majority of ICU nurses had highest mean score practices after implementation of the educational program.

The current study showed that a significant increase in the mean score of practices regarding the assessment of delirium immediately after implementation of the educational program and significant increase was maintained at follow up evaluation.

This result is in agreement with other study conducted by **Solberg et al., (2013)**, who reported that nurses' practice regarding the assessment of delirium improved after implementation of the educational program. Also, a study by **Varghese et al., (2014)** found that there was a highly statistically significant increase in the mean score of nurses' practices regarding the assessment of delirium immediately after implementation and follow-up evaluation of the educational program.

Teaching by lecture, video presentation and group discussion provided the learners with the opportunity to practice delirium screening before approaching real patients. Training has also been found to be a suitable method for teaching ICU delirium and CAM-ICU screening **(Elliott, 2014).** This was included in this study as it provided a combination of both theory and practical application and was effective in improving the skills of the nurses as measured by competency check immediately and 3 months after the program.

In the current study, it was evident that persistent use of delirium screening tools by ICU nurses for assessment delirium 3 months after the program; this might be due to improvement in their knowledge and competency. On the other hand, **Stewart & Bench's** study**, (2018)**, found that delirium screening had increased initially, but it was not sustained over time. They explained that several reasons why an improved understanding and knowledge of delirium and sedation in ICUs did not automatically translate into better compliance.

Firstly, delirium assessment is a complex stepwise time-consuming process and, in most hospitals, done as a part of the research. Secondly, the delirium protocol has been incorporated in the mainstream ICU assessments among the many and ever-increasing protocols in ICUs, staff may find little time for another complex assignment. Thirdly, repeated measurement requirements for delirium also make it laborious and difficult to adopt **(Barr et al., 2013).**

Lastly, delirium in ICUs is usually related to many factors; the assessment of delirium does not directly translate into an immediate improved outcome. The lack of definite direction about its prevention and

treatment also makes screening less attractive. Further investigation on the possible low compliance of the Richmond Agitation Sedation Scale (RASS) and CAM-ICU documentations after the program is highly recommended.

The findings of this study, revealed that, negative and non-significant correlation between nurse's knowledge and practice scores. This could be explained nurses with less knowledge about delirium in the ICU were more likely to have a lower level of effective nursing practice regarding its management. In the same context, with **Younis & Abo Elfetoh., (2014) & El–Nosary et al., (2016),** who reported that there was no correlation between the knowledge of delirium and nursing practice for intensive care nurses**.**

The present study showed that there were no statistically significant relations between demographic and some important work-related variables and mean knowledge score. This could be explained ICU nurses in Yemen have a low level of knowledge about ICU delirium and need accurate and valid knowledge to be able to provide optimal nursing care. This result is in agreement with **Kim & Eun., (2013),** who reported that no significant relationship between demographic and some important work-related variables and mean knowledge score.

In the same line; **Jang & Yeom., (2018),** found that there no significant differences between demographic and some important work-related variables and mean knowledge score, except there, were statistically significant differences between knowledge and their levels of education. Also, this result disagrees with **Ramoo et al., (2018),** who reported statistically significant differences between nurses' knowledge score and their age groups and duration of work in ICU.

The present study showed that there were no statistically significant differences between demographic and some important work-related variables and mean practices scores. This could be explained ICU nurses in Yemen have a lower level of practices about ICU delirium and need accurate and valid skills to be able to provide optimal nursing care. This result in agreement with **Koo & Yang., (2016)** and **Park & Chang., (2016),** who reported that no significant relationship was found between demographic and some important work-related variables and mean practice score.

In the same line; **El–Nosary et al., (2016)** found that there no significant differences between demographic and some important work-related variables and mean practice scores except there were statistically significant differences between knowledge and their levels of education. While, these results disagree with **Kim & Lee., (2016),** who found that there were significant differences between demographic and some important work-related variables and mean practice scores.

Conclusion:

The educational program in this study had a positive outcome when implemented to ICU nurses at Al-Thawra Hospital, Al-Hodeidah City, in Yemen. It is associated with marked improvement of their knowledge about delirium and their practices in nursing care for patients with delirium. These changes also were maintained after 3 months of the program implementation.

Recommendations:

Based on the current study findings, the following recommendations are suggested

- Periodic monitoring of nurses' knowledge and practices to evaluate the level of nurses' practice about delirium and construct program according to their needs.
- Standardized screening tools for evaluation delirium patients should be available in the unit to facilitate early detection and prevention of adverse outcomes associated with this serious but manageable disorder.
- Nursing care of patients with delirium is necessary to be included in the curriculum of nursing schools.
- Repetition of the study on a larger probability sample from the different geographical areas in Yemen to figure out the main aspects of these problems.

References:

- **Abusaad, F., Mostafa, M., & Ibraheim, A. (2017):** Learning Needs Assessment of Pediatric Nurses Regarding Delirium and Its Barriers of Screening at Intensive Care Units. American Journal of Nursing Research, 5(3), 70-78.
- **Akande, I. (2016):** Implementing the Confusion Assessment Method to Improve the Care of Delirious Patients. [Published Doctorate dissertation]. University of Maryland, Baltimore. Retrieved from https://archive.hshsl.umaryland.edu/handle/10713/6547
- **Ali, F., Ismaeil, M., Abdelhalim, Z., & Radwan, W. (2012):** Relationship between Intensive Care Unit (ICU) Delirium and Patient's Outcome in the Critical Care Department El-Manial University Hospital: A Suggested Nursing Intervention Protocol. [Unpublished Doctorate Dissertation]. Faculty of Nursing, Cairo University.
- **Barr, J., Fraser, G., Puntillo, K., Ely, E., Gelinas, C., & Dasta. (2013):** Clinical practice guidelines

for the management of pain, agitation, and delirium in adult patients in the intensive care unit. Critical Care Medicine, 41(1), 263-306.

- **Coyle, M., Chang, H., Burns, P., & Traynor, V. (2018):** Impact of Interactive Education on Health Care Practitioners and Older Adults at Risk of Delirium: A Literature Review. Journal of Gerontological Nursing, 44(8), 41-48.
- **Devlin, J., Marquis, F., Riker, R., Robbins, T., Garpestad, E., Fong, J., Didomenico, D., & Skrobik, Y. (2008):** Combined didactic and scenario-based education improves the ability of intensive care unit staff to recognize delirium at the bedside. Critical Care, 12(1), 1-6.
- **Devlin, J.W., Skrobik, Y., Gélinas, C., Needham, D., Slooter, A., Pandharipande, P., Watson, P., Weinhouse, G., Nunnally, M., Rochwerg, B., Balas, M., van den Boogaard, M., Bosma, K., Brummel, N., Chanques, G., Denehy, L., Drouot, X., Fraser, G., Harris, J. E., & Alhazzani, W. (2018):** Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU. Critical Care Medicine Journal, 46(9), 825-873.
- **Elfeky, H., & Ali, F. (2013):** Nurses' practices and perception of delirium in the intensive care units of a selected university hospitals in Egypt. Journal of Education and Practice, 4(19), 61-70.
- **Elliott, S. (2014):** ICU delirium: a survey into nursing and medical staff knowledge of current practices and perceived barriers towards ICU delirium in the intensive care unit. Intensive and Critical Care Nursing, 30(6), 333-338.
- **El–Nosary, A., Ismail, M., Sultan, M., Abdel-& kader, F. (2016):** Nurses' Knowledge and Practices about Delirium among Intensive Care Unit Patients at Emergency Hospital. [Unpublished Master Thesis]. Faculty of Nursing, Mansoura University.
- **Gesin, G., Russell, B., Lin, A., Norton, H., Evans, S., & Devlin, J. (2012):** Impact of a delirium screening tool and multifaceted education on nurses' knowledge of delirium and ability to evaluate it correctly. American Journal of Critical Care, 21(1), 1-11.
- **Ghaeli, P., Shahhatami, F., Zade, M., Mohammadi, M., & Arbabi, M. (2018):** Preventive Intervention to Prevent Delirium in Patients Hospitalized in Intensive Care Unit. Iranian Journal of Psychiatry, 13(2), 142-147.
- **Halter, M. (2018):** Varcarolis Foundations of Psychiatric Mental Health Nursing: A Clinical Approach (8th ed.). Elsevier Health Sciences.
- **Hare, M., Wynaden, D., McGowan, S., Landsborough, I., & Speed, G. (2008):** A questionnaire to determine nurses' knowledge of delirium and its risk factors. Contemporary Nurse, 29(1), 23-31.
- **Horacek, R., Krnacova, B., Prasko, J., & Latalova, K. (2016):** Delirium as a complication of the surgical intensive care. Neuropsychiatric Disease and Treatment, 12(9), 2425- 2434.
- **Ibrahim, K., McCarthy, C., McCarthy, K., Brown, C., Needham, D., Januzzi Jr, J., & McEvoy, J. (2018):** Delirium in the cardiac intensive care unit. Journal of the American Heart Association, 7(4), 1-11.
- **Jang, B., & Yeom, H. (2018):** Hospice-Palliative Care Nurses' Knowledge of Delirium, Self-Efficacy and Nursing Performance on Delirium. The Korean Journal of Hospice and Palliative Care, 21(2), 65-74.
- **Jeon, K., Jeong, B., Ko, M., Nam, J., Yoo, H., Chung, C., & Suh, G. (2016):** Impact of delirium on weaning from mechanical ventilation in medical patients. Respirology, 21(2), 313-320.
- **Kim, J., & Lee, E. (2016):** Factors affecting nursing performance of delirium for general hospital clinical nurses. Journal of Korean Clinical Nursing Research, 22(2), 183-193.
- **Kim, M., & Eun, Y. (2013):** Knowledge, performance and stress about care for delirium in orthopedic hospital nurses. Journal of muscle and joint health, 20(1), 72-80.
- **Kim, M., & Lee, H. (2014):** The effects of delirium care training program for nurses in hospital nursing units. Korean Journal of Adult Nursing, 26(5), 489-499.
- **Koo, H., & Yang, J. (2016):** Factors Influencing performance of delirium care for postoperative delirium of elderly patients among recovery room nurses. The Journal of Korean Academic Society of Nursing Education, 22(3), 387-395.
- **Lee, S., Fisher, J., Wand, A., Milisen, K., Detroyer, E., Sockalingam, S., Agar, M., Hosie, A., & Teodorczuk, A. (2020):** Developing delirium best practice: a systematic review of education interventions for healthcare professionals working in inpatient settings. European Geriatric Medicine,11(1) 1-32.
- **Lieow, J., Chen, F., Song, G., Tang, P., Kowitlawakul, Y., & Mukhopadhyay, A. (2019):** Effectiveness of an advanced practice nurse-led delirium education and training programme. International Nursing Review, 66(4), 506-513.
- **McKean, S. (2017):** Principles and practice of hospital medicine (2nd ed.). New York: McGraw-Hill Education Medical.
- **Middle, B., & Miklancie, M. (2015):** Strategies to improve nurse knowledge of delirium: a call to the adult-gerontology clinical nurse specialist. Clinical Nurse Specialist, 29(4), 218-229.

- **Morita, T., Fujimoto, K., Imura, C., Nanba, M., Fukumoto, N., & Itoh, T. (2006):** Self-reported practice, confidence, and knowledge about palliative care of nurses in a Japanese Regional Cancer Center: longitudinal study after 1-year activity of palliative care team. American Journal of Hospice and Palliative Medicine, 23(5), 385-391.
- **Morsy, Z., Mustafa, N., & Mourad, G. (2015):** Scenario-Based Educational Program to Improve the Performance of Intensive Care Unit Nurses to Assess Elderly Patient with Delirium [Unpublished Doctorate Dissertation]. Faculty of Nursing, Ain Shams University.
- **National Institute for Health and Care Excellence. (2019):** Guidance: Delirium: Prevention, diagnosis and management: Clinical guideline. Retrieved March 15, 2019, from https://www.nice.org.uk/guidance/cg103
- **Oh, H. (2018):** The effectiveness of clinical practice education using checklist on performance of delirium care for nursing students. Journal of Digital Convergence, 16(10), 289-299.
- **Padilla. (2016):** Delirium Education Program for Critical Care Nurses: A Mixed Methods Study. [Published Doctorate Dissertation]. School of Nursing, University of Nevada. Retrieved from https://digitalscholarship.unlv.edu/thesesdissertations/2719/
- **Park, H., & Chang, M. (2016):** Nurse's knowledge, confidence and performance on care for delirium. Journal of Health Informatics and Statistics, 41(4), 359-368.
- **Park, Y., & Gu, M. (2013):** The development and effects of evidence-based nursing practice guideline for cancer patients with delirium. Evidence and Nursing, 1(1), 4-15.
- **Ramoo, V., Abu, H., Rai, V., Surat Singh, K., Baharudin, A., Danaee, M., & Thinagaran, R. (2018):** Educational intervention on delirium assessment using Confusion Assessment Method-ICU (CAM-ICU) in a general intensive care unit. Journal of clinical nursing, 27(22), 4028-4039.
- **Rawson, H., Bennett, P., Ockerby, C., Hutchinson, A., & Considine, J. (2017):** Emergency nurses' knowledge and self-rated practice skills when caring for older patients in the Emergency Department. Australasian Emergency Nursing Journal, 20(4), 174-180.
- **Ribeiro, S., Nascimento, E., Lazzari, D., Jung, W., Boes, A., & Bertoncello, K. (2016):** Knowledge of nurses about delirium in critical patients: collective subject discourse. Text & Context Nursing Journal, 24(2), 513-520.
- **Smonig, R., Magalhaes, E., Bouadma, L., Andremont, O., de Montmollin, E., Essardy, F., Mourvillier, B., Lebut, J., Dupuis, C., Neuville, M., Lermuzeaux, M., Timsit, J.-F., & Sonneville, R. (2019):** Impact of natural light exposure on delirium burden in adult patients receiving invasive mechanical ventilation in the ICU: a prospective study. Annals of Intensive Care, 9(1), 1-8.
- **Solberg, L., Plummer, C., May, K., & Mion, L. (2013):** A quality improvement program to increase nurses' detection of delirium on an acute medical unit. Geriatric Nursing, 34(1), 75-79.
- **Stewart, C., & Bench, S. (2018):** Evaluating the **implementation** of confusion assessment method-intensive care unit using a quality improvement approach. Nursing in Critical Care, 23(4), 172-178.
- **Tsang, J., Ross, K., Miller, F., Maximous, R., Yung, P., Marshall, C., Camargo, M., Fleming, D., & Law, M. (2019):** Qualitative descriptive study to explore nurses' perceptions and experience on pain, agitation and delirium management in a community intensive care unit. British Medical Journal, 9(4), 1-9.
- **Tuble, G., Saranza, G., Albay's, A., & Anlacan's, V. (2015):** Prevalence of delirium in patients admitted at intensive care units of Philippine General Hospital. Philippine Journal of Chest Diseases, 16(3), 27-33.
- **Van De Steeg, L., IJkema, R., Wagner, C., & Langelaan, M. (2015):** The effect of an e-learning course on nursing staff's knowledge of delirium: a before-and-after study. BioMed Central Medical Education, 15(1), 1-8.
- **Varghese, N., Macaden, L., Premkumar, B., Mathews, P., & Kumar, S. (2014):** Delirium in older people in hospital: an education programme. British Journal of Nursing, 23(13), 704-709.
- **Weheida, S., Al-Metyazidy, H., & Ramadan, A. (2018):** Relationship between Nurses' Burnout and Implemented Evidence Based Guidelines in Intensive Care Units. Journal of Nursing and Health Science, 7(2), 27-35.
- **World Health Organization. (2018):** International Classification of Diseases for Mortality and Morbidity Statistics, Eleventh Revision (ICD-11). World Health Organization.
- **Younis, J., & Abo Elfetoh, S. (2014):** The effect of educational program on critical care nurses' knowledge, practice and clinical outcome regarding delirium among critically ill patients. International Journal of Current Research, 6(7), 7663-7673.