

# Impact of Video Assisted Teaching Intervention on Critical Care Nurses Knowledge Regarding Extracorporeal Membrane Oxygenation

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**Abstract:** well-ordered educational strategies for the teaching of both novice and practiced extracorporeal membrane oxygenation (ECMO) for critical care nurses is essential for the constant function of the ECMO program. **Aim:** This study aimed to evaluate the impact of a video-assisted teaching intervention on critical care nurse's knowledge regarding extracorporeal membrane oxygenation. **Design:** A quasi-experimental (pre/post-test design). **Setting of the study:** critical care units at Al-Thawra Modern General Hospital Authority in Sana'a-Yemen. **The method Sample:** was (75) critical care nurses that of all nurses working in the selected setting. **Tool:** ECMO Pre/Post Nurses Questionnaire. **The implementation phase:** was displayed to five videos sessions to describe video-assisted teaching methods knowledge as well as, to the preliminary one; every session takes about 45 minutes. **Results from the application of the video-assisted teaching program:** shown the enhancement of critical care nurse's knowledge level as regards extracorporeal membrane oxygenation. There has been observed (100%) unsatisfactory level in pre-implementation of the developed ECMO care and (88%) satisfactory level immediately post-implementation of the developed ECMO care but a decrease of the satisfactory level to (84%) with high statistical significance difference between pre, immediately post and three months post-application programs, ( $p < 0.001$ ). **In conclusion,** it can conclude that applying for the video-assisted teaching program about extracorporeal membrane oxygenation is extremely effective in inducing improvement in nurses' knowledge level.

**Keywords:** video-assisted teaching, ECMO, knowledge, Critical Care Nurses.

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## 1. INTRODUCTION

Extracorporeal membrane oxygenation, a treatment modality designed for refractory cardiorespiratory failure, has seen a resurgence in utilizing with ECMO volume growing more than 10-fold over the previous decade among adult patients. (Zakhary et al., 2017)

Extracorporeal membrane oxygenation is one of many terms used for an extracorporeal circuit that squarely oxygenates and removes carbon dioxide from the blood. In most methods to ECMO in patients with acute respiratory distress syndrome, a cannula is implanted in a central vein. Blood is removed from the vein into an extracorporeal circuit via a mechanical pump before entering an oxygenator. Internal the oxygenator, blood passes along one side of a membrane that affords a blood gas mediator for the distribution of gases. The oxygenated extracorporeal blood may thereafter be cooled or warmed as required and is returned to a central vein. (Ravi & Boswell 2020)

The extracorporeal membrane oxygenation circuit is a specific machine utilized for patients with circulatory and/or respiratory failure. This extracorporeal support has become a common device in critical care medicine both in adult and pediatric patients. (*Fouilloux et al., 2019*)

In recent years, the utilize of extracorporeal membrane oxygenation in patients with acute respiratory distress syndrome (ARDS) has grown. Extracorporeal membrane oxygenation is now an agreeable technique for tentatively supporting those with serious ARDS whose status is refractory to traditional management. (*Millar et al., 2019*)

Caring for patients during the cannulation procedure, the extracorporeal membrane oxygenation running and decannulation is very complex. Successful treatment of ECMO patients needs specific baseline knowledge, practical skills, and the capability to successfully work within an Interprofessional and multidisciplinary team. (*Johnston et al., 2018*)

Video modelling is a strategy including the use of videos to afford the modelling of targeted skills. Further, video materials afford a unique chance to present, teach and internalize authentic data, linguistic, cultural, and visual about the target subject. (*Younis & El-Abassy, 2015*)

### Significant of study

The use of video teaching methods in nursing education provides an easy and innovative way to engage today's nursing staff. Video teaching intervention can be easily adapted into nursing training at any level and considered an essential part of nursing education that links theory with practice. Today, it is expected that the nurse should use creative technologies to enrich the learning environment (*Devi et al., 2019*).

The successful delivery of extracorporeal membrane oxygenation needs extremely experienced staff and a minimum number of patients per year; the organization of ECMO programs on a national level is required to provide the best, safest, and maximum efficient care. (*Combes et al., 2014*)

From previous studies, it has been recorded that extracorporeal membrane oxygenation has several attendant risks and complications associated with it. The critical care nurses are close and continuously communicate with patients and defect in knowledge about extracorporeal membrane oxygenation. Therefore, they are uniquely placed to integrate preventive and promotional strategies in the day-to-day care they afford. Therefore, they should know, dealing with these patients connected to ECMO.

### Aim of the study

To evaluate the impact of video-assisted teaching programs on critical care nurse's knowledge regarding extracorporeal membrane oxygenation.

### Hypothesis

1. The mean knowledge score of nurses post-video-assisted teaching program implementation will be more than that of their preprogram implementation scores. **Tables (2)**
2. Relationships will exist between critical care nurse's knowledge and critical care nurse's demographic characteristics. **Table (3)**

## 2. METHODS

### Researcher design

The quasi-experimental design was used in this study with one group pre-test and post-test approach was used to evaluate the impact of a video-assisted teaching intervention on critical care nurse's knowledge for the present study.

### Settings of the study

Data were gathered from the medical intensive care unit, emergency ICU, and surgical ICU at Al-Thawra Modern General Hospital Authority in Sana'a-Yemen.

### Sampling Technique

The convenience sample was (75) critical care nurse's that of all critical care nurses working in a selection set and the line with sample criteria selection bedside nursing staff working in intensive care unit more than one year

## Study Tools

Data relevant to the study were gathered, utilizing the following two tools:

### Tool I: ECMO pre and post Questionnaire sheet

Pre/Post questionnaire was developed via the researcher based on present national and international literature, adopted from (*VINCENT et al., 2017*), (*Brodie & Bacchetta, 2011*) and tested via the researcher then used previously to the implementation of the program to evaluate the exact level of knowledge of nurses about extracorporeal membrane oxygenation. The same tool was utilized immediately after the implementation of the program (immediate post-test), in addition to three months later to evaluate the gain knowledge after the intervention. To assess critical care nurse's knowledge.

The questionnaire consist of:

#### Part one:

Critical care nurse's demographic characteristics of the study sample this part including age, level education, duration of experience, and previous training course. To assess critical care nurse's demographic characteristic

#### Part two:

Critical care nurse's knowledge about extracorporeal membrane oxygenation care included (definition, principle, circuit & components, different configurations, advantages and disadvantages, indications, contraindications, mechanisms, complications, nursing care, infection control). It consists of (51) items. Covering six main parts:

Knowledge about anatomy and physiology of the respiratory tract (question 1-5), definition, principle, circuit & components (question 6 -12), different configurations, advantage and disadvantages (question 13-20), indications, contraindications (question 21-27), the mechanism (question 28-30), complication, nursing care and infection control (question 31-51)

#### Score system

The scoring system for nurses' knowledge was assessed upon fulfillment of the interviewing questionnaire as the nurses' knowledge tested with a model key answer. Therefore, correct answers scored (1), and incorrect answers scored (0). As regard pre and post, questionnaire sheet total score was 51 a degree classified to > 75% satisfactory and < 75% unsatisfactory

#### Development of the video:

The researchers using the following steps constructed videos in the current study:

1- **Review of literature and data collection:** Previously establishment of the video-assisted teaching intervention an extensive literature review was started reviewer of current and past, local and international related literature in the numerous aspects using books, articles, and periodicals, magazine to prepare the videos. The literature gives a critical summary of the topic of interest. In addition, careful courtesy to ensure that the content was perfect, up to date, rationally organized, simple and perfect.

2- **Preparation and organization of the content:** The contents of the videos were organized and structured under various heading according to the study objectives.

3- **Preparation of the video script by sequence:** A script was prepared according to the organized contents. It consisted of all scenes involved in the videos such as Definition, Principle, Circuit & components, different configurations of ECMO. Videos script is a nice map, a blueprint of what is going to be in the videos.

#### 4- Research the story:

Nurses were interviewed by the researcher; make a note of their knowledge of care while communicating with them through closed and open-ended questions. Detect and make a note in which area they deficiency information.

#### 5- Recording the videos:

- The video appropriate by the researcher PowerPoint video record for the theoretical part according to the prepared script.
- The theoretical videos initiate a motivating and interesting method and meet the study objectives.
- The essential contents were summarized at the end of each video
- The video involves section breaks and section titles.
- The video had suitable technical quality.
- The span and pace of each video are suitable.
- The video meets the study objectives.

#### 6- Editing the videos:

Videos editing is the process of manipulating and rearranging video shots. The goals of editing are to remove unwanted footage, choose the best footage, create a flow add effects, graphics, music, alter the style, pace, or mood of the video, give the video a particular position then watch it and take notes. Titles, music, sound editing, color correction, and effects were added. A video expert edited the prepared videos.

#### 7- Evaluating the videos:

The five specialists in the field of critical care nursing and medicine evaluated the videos reviewed the content of the video-assisted teaching program. Their critique, suggestion, opinion, and recommendation were accepted.

#### The theoretical contents:

Contents were the concentration on the lecture about:

Definition, Principle, Circuit & components, Different configurations, Advantage and disadvantages, Indications, Contraindications, Mechanism, Complications, Nursing care, infection control

#### Learning environment:

- The program was achieved in the nursing room of each ICU setting.

#### Teaching methods:

Video-assisted teaching; Lecture, group discussion, demonstration, and re-demonstration were the teaching method used.

#### Teaching materials:

- Video, Poster PowerPoint, were the teaching materials used.

#### Method:

#### The study was performed in 3 phases:

##### Preparatory phase:

- Formal permission to proceed with the aimed study was taken from the head of the medical, emergency, and surgical intensive care unit department as well as the hospital nursing manager after clarifying the aim and nature of the study.
- The tool used in this study was developed in Arabic by the researcher based on reviewing the pertinent literature.
- **The validity of the study tool:** the tool was tested for content-related validity via a jury of five experts in the field of critical care nursing and critical care medicine. The modification was carried out according to experts decision on the clarity of sentences and suitability of contents
- **The reliability** was tested for the tool (knowledge assessment tool), via using Cronbach's coefficient alpha ( $r=0.91$ ) which is acceptable.

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- A **pilot study** was performed on eight nurses to test the feasibility, objectivity, and applicability of the tool, and the essential modification was done. The pilot sample was not involved in the main study
- Approval for voluntary participation was gained from critical care nurses after the purpose and nature of the study were explained.
- Approval was got from the local ethical committee and the study was followed the common ethical principles in clinical research.
- Describe the aim and contents of the study to nursing managers and physicians to gain their cooperation and "permit the release of nurses to attend educational meetings during minimal workload activities.

### Ethical considerations:

The nature and purpose of the study were clarified to nurses and were accepted by the Ethical Committee in the faculty of nursing. Written approval was taken from all critical care nurses that are willing to participate. The study follows the common ethical rules in clinical research and confidentiality and anonymity were secured. Study issues had the right to reject to participate and or withdraw from the study without any explanation at any time and study subject privacy was considered through the collection of data.

### Implementation phase:

The program was applied 15 times for the 15 sub-clusters of nurses. Each cluster included five nurses who were displayed to five videos sessions to describe video-assisted teaching methods knowledge as well as, to the preliminary one; every session takes about 45 minutes.

**Preliminary session:** In this session, the researcher met the contributors and described the objectives, contents, and evaluation of the video-assisted teaching intervention. **Session I included:** Anatomy and physiology of the respiratory system. **Session II included:** definition, principle, circuit & components of extracorporeal membrane oxygenation. **Session III included:** different configurations advantages and disadvantages of extracorporeal membrane oxygenation. **Session IV included:** indications, contraindications. Mechanism of extracorporeal membrane oxygenation. **Session V included:** complications, nursing care, infection control of extracorporeal membrane oxygenation

### Procedure

- Data were assembled (from February 2018 to July 2019) performed for five days in the week during two-shift duties.
- All nurses were interviewed through break time (30 minutes) in different shifts or before the start of the shift.
- At the opening of the video-assisted teaching intervention the objectives, contents, as well as time agenda of the video-assisted teaching intervention, were clarified via the researcher for the contributor to attaining their active contribution and cooperation during the implementation of the video-assisted teaching intervention.
- Request nurses to fill in the questionnaire sheet (**the tool I**) to assess nurses' knowledge previously application of the developed the video-assisted teaching intervention about extracorporeal membrane oxygenation.
- Every theoretical session was achieved in class to include all nurses. All the subjects were presented in the form of videos, PowerPoint the video-assisted teaching intervention, and poster as required
- Each session was opened first with a discussion to assess the critical care nurse's feedback about previous session subjects (5 minutes) then the teaching phase about the definition, indication, frequency of extracorporeal membrane oxygenation (45 minutes).
- The researcher afforded to teach the material as videos about extracorporeal membrane oxygenation to assist critical care nurses during demonstrating it. Videos were offered pre and post demonstration time.
- Every nurse of all studied clusters obtained a copy of videos in the English language translated via the researcher during sessions and booklets in Arabic involved all theoretical.

- An open channel of communication was created between the researcher and nurses to clarify any misconception, reply to any question, and reinforce the right actions.
- In the final session, the researcher summarized and assured the essential points of extracorporeal membrane oxygenation.

**The final phase (the evaluation phase):**

**Evaluation phase:**

The same pre-test study tool (questionnaire sheet **(the tool I)** was applied post-implementation for studied topics to test the efficacy of the video-assisted teaching intervention on nurses' knowledge. Evaluation of knowledge was carried out two times immediately post-implementation of the intervention and post three months later. The comparison was carried out between pre-implemented the video-assisted teaching intervention, immediately post-intervention implementation, in addition to three months later.

**Statistical Analysis:**

Data were assembled and analyzed by computer program SPSS, version 25. Data revealed as mean, standard deviation, number, and percentage. Quantitative continuous data were compared utilizing the ANOVA test for comparisons between more than two groups and the paired t-test is used to decide significance for the numeric variable between two groups. A probability accepts of 0.05 was accepted as a level of significance for testing the research hypothesis.

**3. RESULTS**

**Table (1):- Distribution for socio-demographic data of study sample (n=75)**

Items	No.	%
<b>Age Group</b>		
• < 25 years	40	53.3
• >25- 30 years	27	36.0
• > 30 years	8	10.7
<b>Mean ± SD(range)</b>	26.39±3.39(20- 38)	
<b>Sex</b>		
• Male	30	40.0
• Female	45	60.0
<b>Marital Status</b>		
• Single	41	54.7
• Married	34	45.3
<b>Education level</b>		
• Diploma	54	72.0
• Bachelor	21	28.0
<b>Experience year</b>		
• < 5 years	49	65.3
• > 5-10 years	22	29.3
• > 10 years	4	5.3
<b>Mean ± SD(range)</b>	4.63±3.28(1-15)	
<b>Training Session</b>		
• Yes	0	00.0
• No	75	100.0
<b>Department</b>		
• Medical Intensive Care Unit	20	26.7
• Surgical Intensive Care Unit	20	26.7
• Emergency Intensive Care Unit	35	46.7



Table (2):- Distribution comparison between total and subtotal nurses knowledge about ECMO during three intervention phases (Pre, immediately post, and 3-month post-implementation) for study sample (n=75)

Nurses knowledge items	Pre-implementation test	Immediately post-implementation test	3-month Post-implementation test	Comparison			
	Mean ± SD	Mean ± SD	Mean ± SD	P1. value	P2. value	P3. value	P4. value
Anatomy and physiology	1.92 ± 0.76	4.8 ± 0.43	4.2 ± 0.43	<0.001**	<0.001**	0.001	<0.001**
Definition of ECMO	0.27 ± 0.22	0.98 ± 0.11	0.75 ± 0.43	<0.001**	<0.001**	<0.001**	<0.001**
Principle of ECMO	1.61 ± 0.5	2.77 ± 0.42	2.28 ± 0.45	<0.001**	<0.001**	<0.001**	<0.001**
Circuit & Components	1.28 ± 0.56	2.59 ± 0.59	2.43 ± 0.52	<0.001**	<0.001**	0.04*	<0.001**
Different Configurations	1.0 ± 0.68	2.69 ± 0.46	2.69 ± 0.46	<0.001**	<0.001**	<0.001**	<0.001**
Advantage and Disadvantages	2.03 ± 0.85	4.25 ± 0.80	4.12 ± 0.59	<0.001**	<0.001**	0.25 <sup>NS</sup>	<0.001**
Indications	0.67 ± 0.52	3.48 ± 0.66	3.28 ± 0.50	<0.001**	<0.001**	1.0 <sup>NS</sup>	<0.001**
Contraindications	0.61 ± 0.47	2.69 ± 0.46	2.29 ± 0.45	<0.001**	<0.001**	<0.001**	<0.001**
Mechanism of ECMO	0.41 ± 0.4	2.78 ± 0.47	2.31 ± 0.45	<0.001**	<0.001**	<0.001**	<0.001**
Complication of ECMO	0.60 ± 0.3	3.63 ± 0.54	3.28 ± 0.60	<0.001**	<0.001**	0.001	<0.001**
Nursing care	3.24 ± 1.7	9.95 ± 0.99	9.32 ± 1.38	<0.001**	<0.001**	0.002**	<0.001**
Infection control	1.96 ± 0.86	4.35 ± 0.65	3.79 ± 0.55	<0.001**	<0.001**	<0.001**	<0.001**
Total knowledge	15.41 ± 5.21	43.85 ± 3.92	40.47 ± 4.21	<0.001**	<0.001**	<0.001**	<0.001**

- ANOVA- test                      -Paired T- test                      \*Significant difference at p. value<0.05                      \*NS. Not Significant  
P<sub>1</sub> = per vs. immediately posttest                      P<sub>2</sub> = per vs. 3 month posttest  
P<sub>3</sub> = immediately posttest vs. 3 month posttest                      P<sub>4</sub> = per vs. immediately posttest, 3 month posttest

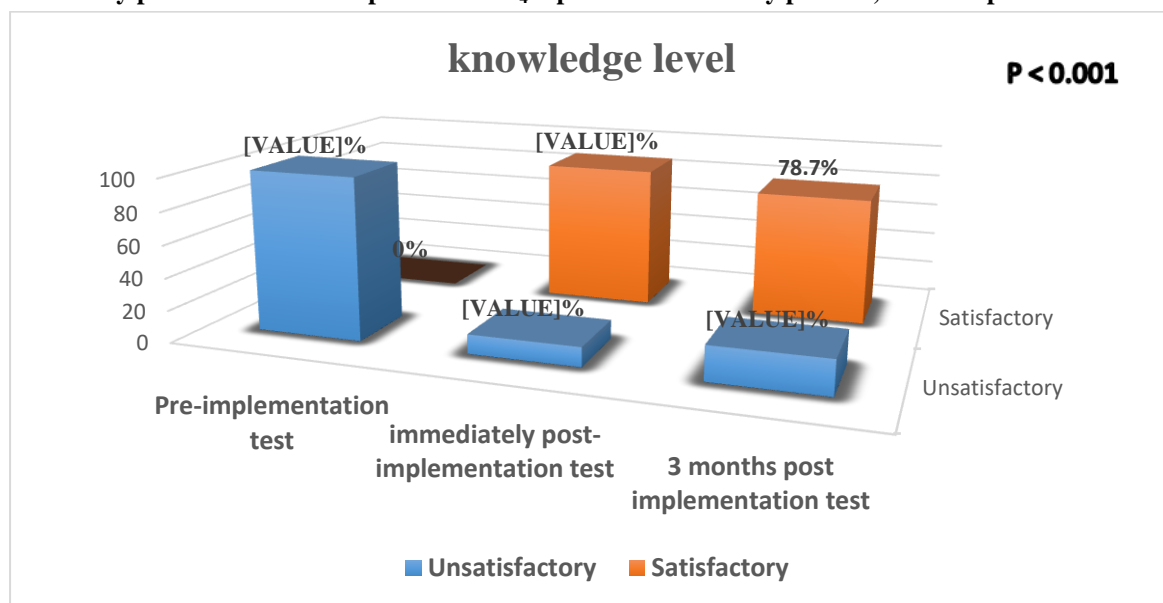


Fig. (1) Demonstration percentage of the knowledge level for nurses about ECMO during three intervention phases (Pre, immediately post, and 3-month post-implementation) for study sample (n=75)

Table (3):- Relationship between nurses knowledge Score about ECMO and their socio-demographic data during three intervention phases (pre, immediately post, and 3-month post-implementation) for study sample (n=75)

Items	Knowledge Score			
	No.	Pre-implementation test	Immediately post-implementation test	3 month Post implementation
		Mean ± SD	Mean ± SD	Mean ± SD
Age group				
• < 25 years	40	14.35±5.16	43.00±4.07	39.23±4.01
• >25- 30 years	27	16.85±5.66	45.37±3.27	42.11±4.23
• > 30 years	8	15.88±2.16	43.00±4.10	41.13±4.05
P. value		0.151 <sup>NS</sup>	0.041*	0.02**

Education Level				
• Diploma	54	12.93±3.71	42.43±3.65	38.22±2.35
• Bachelor	21	21.81±2.06	47.52±1.43	46.24±2.24
<b>P. value</b>		<b>0.001**</b>	<b>&lt;0.001**</b>	<b>&lt;0.001**</b>
Experience Year				
• < 5 years	49	14.57±5.02	43.39±2.97	39.69±3.85
• > 5-10 years	22	17.00±5.69	45.05±3.61	42.18±4.77
• > 10 years	4	17.00±2.16	43.00±4.54	40.50±4.43
<b>P. value</b>		<b>0.159<sup>NS</sup></b>	<b>0.237<sup>NS</sup></b>	<b>0.074<sup>NS</sup></b>
Department				
• Medical Intensive Care Unit	20	16.20±4.02	44.25±3.79	41.50±3.85
• Surgical Intensive Care Unit	20	15.00±6.20	43.30±4.06	40.20±3.90
• Emergency Intensive Care Unit	35	23.66±6.32	43.94±3.99	40.03±4.68
<b>P. value</b>		<b>0.731<sup>NS</sup></b>	<b>0.739<sup>NS</sup></b>	<b>0.451<sup>NS</sup></b>

- T- test      - ANOVA Test      - \*\* Significant difference at p. value<0.05

\*NS. Not Significant

**Table (1).** This table illustrates socio-demographic data for the studied sample involves of 75 intensive care unit nurses. As regard age, more than half of intensive care unit nurses were less than 25 years (53%). As regard sex, nearly two-third of intensive care unit nurses were female (60%). As regards marital status, more than half of intensive care unit nurses were single (54.7%). Regarding the education level, the nursing diploma was the most (72%). As regards to experience year of nurses had an experience of fewer than 5 years was two-thirds (65.3%). As regards previously attended training courses about ECMO was all critical care nurses no attended for training (100%). As regards department was an emergency intensive care unit, nearly half the participants in the study (46.7%).

**Table (2).** This table revealed total and subtotal mean that show improvement this means an immediately post-implementation intervention, in additional decrease mean in three months post-implementation (15.41±5.21, 43.85±3.92 & 40.47±4.21) respectively. Also, I observed there is a highly statistically significant difference between nurse's knowledge about total and subtotal knowledge about ECMO care during three phases of intervention pre-test, immediately post-test and three-month post-test ( p<0.001).

**Table (3).** This table showed that there is a statistically significant difference between knowledge score and age for more than 30 years in the immediate post-intervention and three months post (p= 0.041 & p= 0.02 ) respectively. In addition, there is a highly statistically significant difference between the education level of nurses and the knowledge score in three intervention phases (pre, immediately post and 3-month post) (p <0.001). As regarding experience years, there is a statistically significant difference with knowledge in immediately posttest and three months posttest (p= 0.007 & p= 0.034) respectively.

**Figure (1).** This figure reveals the difference between the levels of nurse's knowledge as regard pretest, immediately posttest, three months post-implementation intervention. There has been observed (100%) unsatisfactory level in pre-implementation of the developed ECMO care and (88%) satisfactory level immediately post-implementation of the developed ECMO care but a decrease of the satisfactory level to (84%) in three-month post-implementation with highly statistically significant difference (p <0.001).

#### 4. DISCUSSION

Extracorporeal membrane oxygenation (ECMO) is life-saving, high-risk support for acute cardio-respiratory failure, not responsive to conventional treatment. (Raffaeli et al., 2018)

Proficiency in a high-tech procedure needs extensive training, which includes comprehensive knowledge of ECMO principles and the technical ability to achieve time-critical and well-coordinated emergency troubleshooting. (Jones-Akhtarekhavari et al., 2017)



ECMO education should be based on evidence-based learning approaches and should integrate novel techniques as evidence to support these approaches continues to mount. ECMO education does not final after the initial training; ongoing educational sessions are required even for experienced ECMO workers especially about the management of ECMO emergencies, effective Interprofessional teamwork, and communication. Further work to discern the ideal frequency, content and delivery of ECMO educational sessions is needed. (*Johnston et al., 2018*)

Video technology is suitable more popular because it has single features that capture exactly the nature of nursing phenomena. Furthermore, video technology is used widely in nursing as an educational tool that is valuable because it provides continuous multi-media, multisensory data about the topic and its context (*Balasubramanian et al., 2018*).

Statistical results of the current study were present in two main parts. **Part I:** Descriptive statistical results related to the demographic characteristics of critical care nurses (Table1). **Part II:** Delineated hypothesis testing for being support or not (Tables 2, 3) and (Figures 1).

Based on our results of the intervention implementation, it has been noticed that intensive care unit nurse contributor's age more than half of the nurses were less than 25 years. The results of the present study agree with *Hassan et al. (2018)* who reported the age of the intensive care nurses more than half of them aged between 20 - < 25 years. As regards to sex of the nursing contributors, the present study was nearly two-thirds females. This in line with *Mohammad E. (2018)* who documented nearly two-thirds of intensive care unit nurses' contributors in her study were females. Regarding level education, nursing has a diploma that was the most in the current study. This finding agreement with *Abdullah M. et al. (2014)* mentioned the majority of theme samples having diploma education. As regarding experience years in this, the study was more than half of nurses had less than 5 years of intensive care experience. In line with *Mohammad E. (2018)*, *Kaur A. & Charan G. (2018)* that reported nearly half of intensive care unit nurses experienced between 1- < 5 years.

#### **Nurses knowledge regarding extracorporeal membrane oxygenation**

In our study results, the implementation of the video-assisted teaching intervention revealed improvement of critical care nurses knowledge score and level as regarding extracorporeal membrane oxygenation concept definition, principle, circuit & components, different configurations, advantage and disadvantages, indications, contraindications, mechanism, complications, nursing care, infection control. This has shown to occur immediately post-implementation but revealed a little decline in the total mean of knowledge post three months later follow up. In addition, the result of the present study supported the stated *hypothesis I* that, there was a highly significant improvement of knowledge level at both immediate post and three as compared with the pre-implementation phase.

These results supported by (*Abd Elaziz, et al. 2021*) who documented video-assisted teaching intervention had a positive effect on the improvement of nurses' knowledge and practice level, which indicates that the video-assisted teaching intervention is an effective method

The current results are supported by (*Kirshnakumar & Priyadarshini, 2019*) who noticed the study findings indicate that the Video-assisted Teaching Intervention was effective in enhancing the knowledge and skills of staff nurses.

These results are in agreement with those of (*Shinde & Mahadalkar, 2018*) who mentioned found that the study findings reveal that video-assisted teaching is effective to increase the knowledge of staff nurses.

The current results agree with (*Karale et al., 2018*) who reported study concludes that there was a significant gain in knowledge score after structured teaching interventions of 3rd year nursing students and the need for organizing such teaching interventions.

This finding in line with (*Azhagesan et al., 2017*) who mentioned the Majority of nurses' student demographic variables are highly significant after the video teaching intervention.

This finding agreement with (*Kaur & Qureshi, 2019*) who documented the video teaching intervention was effective in bringing about an increase in knowledge of the care providers.

In addition, these results supported by (*Begum, 2015*) who documented the study results show that comparatively, video-assisted teaching is more effective in promoting Quality of life than a self-instructional module.

In the current study, the results revealed that about nearly all of the intensive care unit nurse's unsatisfactory level knowledge before implementing the video-assisted teaching intervention. This reflects insufficient continuous education and especially training session. In addition, this might be the majority of nurses hold diploma degrees, not available of references and books if a theme has the book in English language difficult nurses for reading because that not update of knowledge and sometimes lack staff orientation in the different intensive care unit.

In addition, these results supported by ( *Thomas et al., 2019*) who documented showed that video-assisted teaching on hospital infection control measures. Infections were effective in supporting participants to increase their knowledge levels

In accordance with these results, (*Abdelgadir et al., 2018*) concluded the implementation of the nursing intervention protocol showed a significant improvement in the ICU nurses' level of knowledge.

(*Mahendra 2010*) supported our results that reported the video-assisted teaching intervention was significantly effective in increasing the knowledge and attitude level of staff nurses.

Our finding study in the same line with ( *Fouilloux et al., 2018*) who reported the implementation of education and training courses for ICU nurses in charge of patients on ECMO is feasible and reliable. It improves nurse's levels but also shares in improving the global level of the team to which they belong.

This is the line with ( *NADU, 2015*) who noticed after the implementation of the video-assisted teaching intervention, the mean post-test knowledge was found for most of the patients having adequate and moderately adequate knowledge levels.

The present study agrees with (*Holland et al., 2013*) who noticed an online video of a best practice exemplar as an adjunct to taught clinical skills sessions improves student assessment results and satisfaction ratings.

As regarding three months, post-implementation follow up there is a decrease in the total score of knowledge and practice with a statistically significant difference between pre-implementation and post-three months follow-up implementation. This might be due to no feedback of knowledge and assessment of staff continuously for motivation them for update performance, not update of knowledge and intensity of the workload of critical care nursing

This finding has proven by (*Falk, 2015*) who documented the educational intervention showed a significant increase in the Glasgow Coma Scale assessments during the one and two-month periods after the intervention but with a decrease at three months post-intervention

In addition, these results were supported by (*Nteli et al., 2014*) who documented hand hygiene in a pediatric intensive care unit should implement promotion interventions among all personnel by using both different and continuous interventions to ensure a high level of appropriate practices among healthcare professionals.

Regarding the relationship between knowledge score and Scio demographic that included age >25- 30 years, the relationship between knowledge score and level of education in the post immediately implementation, three months later post-implementation. In addition, the result of the present study supported the stated *hypothesis II* that, there was a highly significant difference between knowledge score and Scio demographic. This reflected no previous training on teaching interventions regarding knowledge and Scio demographic data about ECMO and the importance of integration between theory and Scio demographic.

This finding agreement with (*Shaban et al., 2019*) who documented no significant correlation of age, years of experience, experience in dealing with ECMO patients, educational level, and knowledge

This finding has been proven by ( *Pradhan & Nayak 2016*) who documented there is an extremely significant association between the demographic variables like mass media exposer and the post-test knowledge.

The present study disagreement with ( *Tamizharasi, 2012*) who reported there is no significant association was found between post-test knowledge scores of nurses when compared to demographic variables.

This finding in contrast with (*Bassuni & Bayoumi, 2015*) who mentioned could be attributed to indicate that no significant difference regarding knowledge between staff nurses and years of experience, that may be due to deficiency of training course in intensive care units, shortage of staff nurses, lack of self-learning

## 5. CONCLUSION AND RECOMMENDATION

Based on our the finding of the current study, it can be concluded that implementing the video-assisted teaching intervention about extracorporeal membrane oxygenation is highly effective in inducing improvement in critical care nurses' related knowledge. There is a statistically significant difference between studied critical care nurses pre, post-implementation, and three months post-implementation

### Recommendations

Based on our the finding of the current study, it is recommended that,

- The same study can be conducted with different populations, settings, samples, and using a different teaching method.
- Staff training and continuing education, as well as regular audits evaluating intervention performance, should be routinely organized to assure quality
- Encourage training courses about extracorporeal membrane oxygenation that should be mandatory for newly employed nurses.

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