

Effectiveness of An Instructional Program on Nurses' Knowledge Regarding Nursing Follow Up to Weaning From Mechanical Ventilation in Intensive Care Units in Baghdad Teaching Hospitals

*Layth A. K. Al-Tameemi, MSc.N1, Dr. Khalida Mohammed Khudur, PhD2

¹(Academic Nurse, Adults Nursing, College of Nursing, University of Baghdad, Iraq)

²(Assistant Professor, Adults Nursing, College of Nursing/ University of Baghdad, Iraq)

Corresponding Author: *Layth A. K. Al-Tameemi

Abstract:

Background: Weaning from mechanical ventilation is a process that signals a change in the interaction between the ventilator and the patient, this process aimed to decrease ventilatory support and thus require the patient to enhance the ability of the patient to support their oxygenation and/or ventilation needs.

Objective: the main aim of the study is to determine the effectiveness of an instructional program on nurses' knowledge regarding nursing follow up to weaning from mechanical ventilation in intensive care units.

Methodology: A quasi- experimental design was used in the present study with the application of a pre-test and post-test approach for the study group and control group after implementation of instructional program. Data collection was done at two times: firstly baseline data (before any intervention was provided to the study group) and 21 days (after giving the instructional program in the study group). The period of the study was from 5th of October, 2016 to 30th of June, 2017.

Results: The results of this study shows that there is a highly significant difference between pre & post-test in the study group, while there is a trivial difference between pre & post-test in the control group, and there are associations between nurses' educational level and specific training courses in ICUs with their overall knowledge.

Conclusion: The knowledge of the nurses regarding weaning from mechanical ventilation has been improved after implementation of the instructional program in the study group, which reveal that the effectiveness of the provided program was highly beneficial.

Recommendations: the study recommended that special education programs should be carried out for the nurses who are working in the ICUs, to raise their awareness toward weaning from mechanical ventilation complications and how to prevent and manage it.

Keywords: Instructional, Knowledge, Weaning, Mechanical ventilation.

Date of Submission: 19-07-2017

Date of acceptance: 14-08-2017

I. Introduction

Mechanical ventilation (MV) considered as a life support system for critically ill-intubated patients, by using a machine that helps patients to maintain oxygenation and carbon dioxide excretion, the initiation of MV is depending on patients' ability to support their oxygenation and/or ventilation needs. The patient, who cannot stay within normal range of CO₂ levels and acid-base status, indicated as respiratory failure. That's why it's used for critical ill intubated patients in the intensive care unit (ICU), so despite of the diagnosis and patient situation but most patients can be extubated or weaned from mechanical ventilation without difficulty⁽¹⁾. It considered as a lifesaving intervention for critically ill patients and the most frequent cause for an adult patient admission to the ICU and to those who complain from respiratory lung pathology. The nurse plays an important role in the critical care units worldwide thus critical care nurses must have a specialist knowledge about ventilator machine in order to provide safe and optimal level of care for mechanically ventilated patients⁽²⁾.

The goals of mechanical ventilation are to protect the lungs from barotrauma, provide oxygenation, reduce the patient's work of breathing (WOB), provide patient comfort, and to correct acid-base imbalances, the indication for MV is acute or chronic respiratory failure. There are two types of failure which may both be present: Ventilatory failure and hypoxemic failure⁽³⁾. Weaning from mechanical ventilation (WMV) is the process that signals a change in the interaction between the ventilator and the patient by preparing patient to be able to spontaneous breathe gradually whatever was the cause of the respiratory failure, this process aimed to

decrease ventilatory support and thus require the patient to take on himself a greater proportion of the ventilatory workload with monitoring of patient's response to spontaneous breathing⁽⁴⁾.

II. Aims of the study

This study aims to (1) determine the effectiveness of an instructional program on nurses' knowledge regarding nursing follow up of weaning from mechanical ventilation in intensive care units in Baghdad teaching hospitals, (2) to find out the relationships between nurses' knowledge and their socio-demographic characteristics.

III. Methodology

Design of the study: A quasi-experimental study

Sample of the study: A non - probability purposive sample was randomly selected which consists of 80 nurses was divided into two groups, experimental group consisted of (40) nurses exposed to an instructional program and control group consisted of (40) nurses were not exposed to the program.

Setting of the study: The study was conducted at six teaching hospitals in Baghdad city which include (Alkindy Teaching Hospital, Neurosurgery Teaching Hospital, Baghdad Teaching Hospital, Ghazy Al-hariri for Surgical Specialties hospital, Al-Yarmok Teaching Hospital and Medical city of the Al-imamain Al-kadhimian), collected from October 5th, 2016 to June30th, 2017.

Instruments: The questionnaire was constructed for the purpose of the study. The Instrumentsconsisted of two parts:

Part I: Socio-demographic Date Sheet: This part concerned with personal information of the patients including: (gender, age, marital status, educational status, years of employment, years of experience in ICUs and number of training courses in ICUs).

Part II: Knowledge of ICUs nurses regarding weaning from mechanical ventilation:The measurement of effectiveness of an instructional program through the nurses' knowledge questionnaire includes (33) items (10 true and false questions and 23 items multiple choice questions). This part was consisted of three main domains:

- A. Knowledge of ICUs nurses regarding general information of respiratory system which consist of (10) items.
- B. Knowledge of ICUs nurses regarding mechanical ventilation which consist of (13) items.
- C. Knowledge of ICUs nurses regarding nursing follow up for weaning from mechanical ventilation which consist of (10) items.

The control group were given pretest & post-Test of patient' knowledge at the same time that begiven to the study group.

Validity of the instrument:Constant validity determined for questionnaire through theuse of (23) panel experts who are faculty members from college of nursing and anesthesiologists. The experts were asked to review the questionnaire for content with clarity. Some changes were employed according to their suggestions and valuable comments.

Reliability of the instrument: Pilot study was carried out from January 22th, 2017 to February12th, 2017. Ten nurses were selected from Neurosurgery Teaching Hospital. The results of the reliability present alpha correlation coefficient were (r= 0.916) which considered statistically acceptable.

Statistical methods:The analysis of the data was used through descriptive statistics (frequencies, percentages, and the arithmetic mean and standard deviation) and statistical inferential (T-Test) in order to find the differences between the experimental group and the control group.

IV. Results

b Distribution Of The Study Samples (Study And Control) According To The Demographical Data.

Variables	Groups	Study group		Control group	
		Freq.	%	Freq.	%
Gender	Male	24	60	22	55
	Female	16	40	18	45
	Total	40	100	40	100
Age Groups	20- 29	18	45	20	50
	30 –39	16	40	14	35
	40 –49	5	12.5	5	12.5
	50- above	1	2.5	1	2.5
	Total	40	100	40	100

	Mean	32.25		31.50	
Marital Status	Married	25	62.5	26	65
	Single	15	37.5	14	35
	Total	40	100	40	100
Educational Levels	Secondary school	4	10	4	10
	Institute	17	42.5	19	47.5
	College and above	19	47.5	17	42.5
	Total	40	100	40	100

This table displays the frequency counts for selected variables. As mentioned above, the two groups (control versus study) were equal in size (40 participants for each of them). Most of the participants in both groups according to their gender are male (n= 24; 60 %) in the study group, while the number in the control group is (n= 22; 55 %). The mean age for the study group is (32.25) and for the control group is (31.5). More than a third of the participants in the study group are in the 20 – 29 years-old age group (n = 18; 45%), and half of those in the control group are in the 30 – 39 years-old age group (n = 20; 50 %).

Most of the participants in the study group are married (n = 25; 62.5 %), and almost the same proportion of the married participants in the control group (n = 26; 65 %). Most of the participants in the study group are graduated from college and above levels (n = 19; 47.5 %), followed by those who graduated from institute (n = 17; 42.5 %). On the other hand, the same proportion but in reverse in the control group are institute graduated (n = 19; 47.5 %), followed by those who graduated from college and above (n = 17; 42.5 %). These findings would suggest that the randomization process provide an acceptable level of equality between the groups.

Table (2):Distribution of the Study Samples (study and Control) according to their years of expertise and kind of training courses.

Variable	Groups	Study group		Control group	
		Freq.	%	Freq.	%
General years of experience	1 - 5	24	60	25	62.5
	6 - 10	8	20	7	17.5
	11 - 15	5	12.5	2	5
	16 and above	3	7.5	6	15
	Total	40	100	40	100
Specific years of experience	1 - 5	32	80	27	67.5
	6 - 10	5	12.5	8	20
	11 - 15	2	5	2	5
	16-above	1	2.5	3	7.5
	Total	40	100	40	100
Specific training courses in ICUs	1-3	31	77.5	30	75
	4 and above	-	77.5	3	7.5
	None	9	22.5	7	17.5
	Total	40	100	40	100

Table 2 shows that the general years of experience in the study group ranged from 1-5 years are (n = 24; 60 %) followed by those who have 6-10 years (n = 8; 20 %) and who have 11-15 years (n = 5; 12.5 %) respectively. While regarding the general years of experience in the control group almost the same proportion that ranging from 1-5 years are (n = 25; 62.5 %) followed by those who have 6-10 years and who have 16 and above years (n = 7; 17.5 %) (n = 6; 15 %) respectively.

The vast majority of participants concerning specific years of experience in the study group had 1 - 5 years (n = 32; 80 %). The participants in the control group also had 1 - 5 years but in a smaller proportion (n = 27; 67.5%). Additionally, in both of study and control groups more than two third of participants reported that they had 1-3 times (n = 31; 77.5 %) (n = 30; 75 %) regarding specific training courses in ICUs.

Table (3): Assessment of nurses' knowledge scores pre and post-test for the study and control groups related to weaning from mechanical ventilation.

List	Item	Study				Control			
		Pre-Test		Post-Test		Pre-Test		Post-Test	
		Mean	Ass.	Mean	Ass.	Mean	Ass.	Mean	Ass.
1	Mechanical ventilation define	1.25	V	1.6	M	1.2	V	1.25	V
2	Weaningdefine	1.68	M	1.88	G	1.63	M	1.8	G
3	User situation in mechanical ventilation device which gives the device a number of times breathing and the volume of air a predetermined him, according to the patient's condition is	1.5	W	1.85	G	1.3	W	1.35	W
4	situation that is not during weaning from mechanical ventilation is:	1.45	W	1.98	G	1.53	M	1.63	M
5	The index, which is one of the useful ways to judge the likelihood of successful weaning is	1.6	M	1.9	G	1.58	M	1.48	W
6	Tools that are used at weaning and the removal of the endotracheal tube is	1.25	V	1.83	G	1.28	W	1.2	V
7	possibility of weaning failure is increased when:	1.33	W	1.73	M	1.2	V	1.18	V
8	patient gets 80% FIO2 and 15 PEEP predict weaning in this case is:	1.63	M	1.85	G	1.58	M	1.63	M
9	To avoid pulmonary edema must be:	1.28	W	1.8	G	1.58	M	1.3	W
10	pharyngeal reflex (gag reflex) is:	1.85	G	1.6	M	1.7	M	1.25	V
Total mean of nurses' knowledge about patient was weaned from mechanical ventilation		1.48	W	1.80	G	1.46	W	1.41	M

Ass. = Assessment; G. = Good (1.76 - 2); M. = Moderate (1.51 – 1.75); W. = Weak (1.26 – 1.50); V. = Very weak (1 – 1.25)

According to this table, there are differences in the mean of the study group between the pre and post-test, which reveal that there are highly improvement in nurses' knowledge related to weaning from mechanical ventilation, unlike the results of the control group which show that there are a trivial differences of mean between pre and post-test

Table (4): Comparison significance of nurses' knowledge related to weaning from mechanical ventilation between study and control group.

Group	Pre-Test			Post-Test		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation
Study	40	1.48	0.19	40	1.80	0.11
Control	40	1.46	0.18	40	1.41	0.20
t-test	0.699			12.09		
P-value	0.755			0.00		
Sig.	NS			HS		

*At p < 0.05; HS= Highly Significant; NS= Not Significant; Std. Deviation = standard deviation

This table shows that there is no significant differences between both groups (study and control) at pre-test. Whilst there is significantly shown differences between the study and control groups in the mean score of the study group, at p<0.01, which is higher than the mean of score in the control group at post-test as presented in the results that related to weaning from mechanical ventilation.

Table (5): Association between Nurses' Socio-Demographic and their Overall Knowledge of the Study Group

Correlation	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Gender	-.312-	.484	-.074-	-.644-	.524
Age	.056	.394	.021	.143	.888
marital status	.038	.503	.009	.075	.941
educational level	2.666	.377	.850	7.076	.000
general years of experience	.086	.375	.040	.230	.820

specific years of experience	-.181-	.464	-.059-	-.390-	.699
specific training courses in ICUs	-.438-	.197	-.265-	-2.228-	.033

B= unstandardized coefficients; Std. Error= standard errors; Beta= standardized coefficients; t= t-statistics; Sig. = significance

There are associations between nurses' educational level and specific training courses in ICUs with their overall knowledge (p-value = .000, .033) respectively, at p-value < 0.05.

V. Discussion

The results demonstrated that the highest percentage of the participants in study group are male (60%) while only (40%) are female. This goes in the same line with the control group where (55 %) are male and (45%) female, it shows no statistical differences association between nurses' knowledge and gender (at p value 0.524). This totally agrees with a study published concerning nurses who were working at critical care units in Baghdad which stated that the majority of the study and control groups were male (73.3 %), (70%) respectively. So it shows that there aren't any significant relationship between nurses' knowledge and their gender (at P=0.418) ⁽⁵⁾. However, Abed & Kadhim, consistent with these results by stating that most of participants in their study were males (n = 45; 64.3%)⁽⁶⁾. Another study done in Iraq show that there is no significant differences between the participants in the study and control groups regarding their gender⁽⁷⁾, Labeau, support these results by demonstrating that the majority of study sample were female (72%) while the minority were male (28%), they showed that there were no statistical differences between nurses' knowledge and their gender (p value 0.647)⁽⁸⁾.

The majority of the participants in the study group (45%) are in age group of (20 – 29) years with mean age (32.25), whilst in the control group (50%) of the sample are in age group (20 – 29) years with mean age (31.5), so there are no statistical differences between nurses' knowledge and their age (at p value 0.888). These results supported by Jaddoua, when showing that about (24%) of the nurses were in the age group (28-32) years, and (16%) were in (23- 27) years age group. That's totally agreed where there were no statistical differences between nurses' knowledge and their age (at p value 0.232)⁽⁹⁾. another study done by Al Fatlawi, are consistent with these results, which indicated that majority of the sample at age group 20-27 years old and there is no relationship between nurses knowledge and their age (P = 0.501)⁽¹⁰⁾. Some studies results disagree with the recent study when describing that the majority of the study sample (58.3%) who worked in ICUs were old age, there were no statistical differences between nurses' knowledge regarding their age (p value 0.840) ⁽¹¹⁾⁽¹²⁾⁽⁷⁾.

Most of the participants in the study group are married (62.5 %), and almost the same proportion of the married participants are in the control group (65 %), there is no statistical difference between nurses' knowledge and marital status (p value 0.941), another study by Abed & Kadhim, are consistent as well with these results when indicating that more than the half (54.3%) of the study sample were married⁽⁶⁾. Several studies showed the same results which indicated that the majority of the study sample were married too ^{(13), (14)}.

Most of the participants in the study group are graduated from college and above levels (47.5 %), followed by those who graduated from institute (42.5 %). On the other hand, the same proportion but in reverse in the control group are institute graduated (47.5 %), followed by those who graduated from college and above (42.5 %). There are high significant differences between nurses' knowledge and their level of education between the study and control group (p value 0.000).

The control group results consistent with Jaddoua, which revealed that the majority of the participants were nursing institute graduated, whilst only (11%) were nursing collage graduated which disagreed with the current study results in the study group⁽⁹⁾. Alsultani, and Hammoud & Mohammed, also disagreed by stating that majority of the sample who were working in ICUs graduated from medical institute in both of the groups, these supported by who showed that majority of the sample were institute graduate⁽¹⁵⁾⁽⁷⁾. In response to the crucial needs for qualified nursing staff who were especially working in the critical care units, there were increment in the nurses' proportion who graduated from college of nursing, that's why the Iraqi ministry of health responded to that and emphasized on nomination of college graduated in ICUs (The researcher).

Regarding to general years of experience in nursing field, the majority of the participants in study and control groups (60 %) (62.5 %) respectively, are ranging in their years of experience from 1-5 years, so there wasn't any significant relationship between nurses' knowledge and their general years of experience (p value 0.820). Some studies results supported the recent study when reported that most of the sample (67.2%) had 1-5 years of experience in nursing field⁽⁶⁾. However, Hassan , disagreed with these results by mentioning that the years of experience of their sample were more than five years account (45%) in study group, and (42.5%) in

control group, and there weren't significant differences between nurses' knowledge and their general years of experience (p value 0.539)⁽¹⁶⁾.

The majority of participants concerning specific years of experience in ICUs in the study group had 1 - 5 years (80 %), a smaller proportion are found in the control group (67.5%). The results show no statistical differences between nurses' knowledge and specific years of experience (p value 0.699). These results regarding the number of years of experience in ICUs agree with Hammod & Mohammed, that stated both of the groups in their study had (1- 4 years) represented as (68%) of nurses in the study group and (60%) of nurses in the control group⁽⁷⁾. In a study conducted in Iraq by Hassan, the experience in ICUs of more than a half of the sample (68.0%) had (1-4) years in the study group, and (60.0%) were in the control group⁽¹⁶⁾. Due to the insufficient years of nurses' experience in ICUs, there were a low level of work quality also in Abed & Kadhim, study, so the majority of them had 1-5 years of working in RCU (80%)⁽⁶⁾. which is consistent with Anders, who indicated that ICUs experience of 2.5 years⁽¹⁷⁾.

Most of the participants in the study group (77.5%) regarding specific training courses in ICUs, had 1-3 times, while (75%) of participants in control group had 1-3 times of specific training courses in ICUs. There are a significant difference between nurses' knowledge and specific training courses that they've been taking in ICUs (p value 0.03). Abed & Kadhim, reported that (65%) of the study sample had specific training in RCUs which is agreed with the current study results and also there is a significant difference between nurses' practices and training courses in RCU (p-value = 0.048)⁽⁶⁾. Buckley & Andrews, also documented that about (71.4%) of respondents claimed their knowledge from clinical work in ICU and from continuing education courses (42%)⁽¹⁸⁾. The relationship between the level of nurses' knowledge and the number of the specific training courses that they got in the critical care units is an important indicator, which can facilitate improving the quality of provided care to the critical ill patients through increasing the number of training courses concerning this topic (The researcher).

The Mean knowledge related to weaning from mechanical ventilation for participants in the study group has increased from weak in the pre-test stage to good level in the post-test stage. On the other hand, there was a trivial difference in the mean knowledge for participants in the control group for the pre-test and post-stages. These differences in the study group between the pre and post-test, reveal that there are highly improvement in nurses' knowledge related to weaning from MV, as a result of presentation of the instructional program, unlike the results of the control group who didn't receive the program. But the researcher couldn't find any explanations or references which support this point.

There are associations between nurses' educational level and specific training courses in ICUs with their overall knowledge in this study. Some studies support these results where the higher proportions of the educated nurses at the baccalaureate level or higher, lead to decrease mortality and failure-to-rescue rate⁽⁶⁾. As a result of that, those nurses can control the situations and participate in increase survival rate especially in the critical cases. So the higher educational level that acquired by the nurses, will mean a better quality of care (Researcher).

Training courses especially in the critical care units can improve the scientific and practical framework of the nurses whose working there, so the enhancement and the will is toward increasing the number of provided training courses inside and outside the country specifically regarding ICUs, will lead to a dream of comprehensive care that can be given (Researcher).

VI. Conclusion

The study concluded that the effectiveness of an Instructional program regarding nurses' knowledge concerning nursing follow up to weaning from mechanical ventilation is a positive at a highly significant rate.

VII. Recommendations

- Manual or booklet of instructions about weaning from mechanical ventilation and how to manage the complications that can occur should be published and delivered to the nurses, who work in the critical care units.
- Special education programs should be carried out for the medical staff and specifically for the nurses who are working in the ICUs, to raise their awareness toward weaning from mechanical ventilation complications and how to prevent and manage it.
- Encouraging the efficient nursing staff in the hospitals to participate in teaching, providing, and maintaining the necessary information about mechanical ventilation through lectures and continuous education to the recently employed staff.

Acknowledgements

I would like to express my sincere appreciation for all those who have supported and helped me through my journey in this life and have been there for me, especially Assist Prof. Dr. Khalida Mohammed

Khudur my supervisor and mentor. Special thanks and appreciation to all of my friends and colleagues especially Wissam Wardia, Salam Kamel and Aqeel Kadhim - It has been a long journey and thank you for all the support, you are never deserted me and I am forever grateful.

References

- [1]. Rose L, Dainty KN, Jordan J and Blackwood B, weaning from mechanical ventilation A scoping review of qualitative studies, American journal of critical care, September 2014, Volume 23, No. p. 5.
- [2]. Botha L, level of nurses' competence in mechanical ventilation in intensive care units of two tertiary health care institutions in Gauteng, Johannesburg, University of the Witwatersrand, 2012, pp. 51, 2, <https://www.google.iq/webhp?sourceid=chromeinstant&ion=1&espv=2&ie=UTF8#q=LEVEL%20OF%20NURSES%E2%80%99%20COMPETENCE%20IN%20MECHANICAL%20VENTILATION%20IN%20INTENSIVE%20CARE%20UNITS%20OF%20TWO%20TERTIARY%20HEALTH%20CARE%20INSTITUTIONS%20IN%20GAUTENG.>
- [3]. Egerod I, Mechanical ventilator weaning in the context of critical care nursing, A descriptive, comparative study of nurses' decisions and interventions related to mechanical ventilator weaning, 2003, pp. 1, 2, 3, 4.
- [4]. Hess D, 2001, Ventilator Modes Used in weaning, journal of Respiratory Care, Massachusetts General Hospital, Boston, pp. 474, 475.
- [5]. Ali MH & Hassan H, 2016, effectiveness of nursing educational program on nurses' knowledge toward venous thromboembolism at Ibn Alnafees Teaching Hospital, IOSR journal of nursing and health science, vol 5, issue 5, pp. 28, 29.
- [6]. Abed H. & Kadhim H; Evaluation of Nurses' Practices toward the Control of Patients' Complications at the Respiratory Care Unit in Baghdad Teaching Hospitals, Iraqi National Journal of Nursing Specialties, 2014; Vol. 27, no 1, PP: 47-58.
- [7]. Hammod H, Mohammed S; Effectiveness of an Educational Program on Nurses Knowledge Concerning Complications Prevention of Mechanical Ventilation at Intensive Care Unit in Al- Hussain Teaching Hospital at Nassiryah City. Kufa journal for nursing sciences, August 2016, Vol. 6 No. 2.
- [8]. Labeau S., Vereeke A., Vanndijk DM., critical care nurses knowledge of evidence based guidelines for preventing infectious associated with central venous catheters, A.M.J critical care, 17 Jan., 2008., Vol.(7), No.(1): Pp65-71
- [9]. Jaddoua BA, Mohammed WK & Abbas AD, Assessment of Nurse's Knowledge Concerning Glasgow Coma Scale In Neuro Surgical Wards, Journal of Kufa for Nursing Science. Vol. 3, No 2, 2013, pp. 4, 5
- [10]. Al- Fatlawy D.M.H., Determination of Nurses' knowledge Toward Care Provided to Patients with Acute Myocardial Infarction in Al-Najaf City, Al-kufa journal of nursing sciences, 2011, Vol 2, No2, Pp. 1-11
- [11]. Edwards M, Thronson K, Girardin J, Survey of Canadian critical care nurses' experiences of conflict in intensive care units, 2012, U.S. National Library of Medicine, available online at <http://www.ncbi.nlm.nih.gov/pubmed/23035375>.
- [12]. Hany G.E., Warda Y. M. & Hanaa A.A., Intensive Care Nurses' Knowledge & Practices regarding Infection Control Standard Precautions at a Selected Egyptian Cancer Hospital., Journal of Education and Practice., 2013, Vol.(4), No.(19). Pp 430-433.
- [13]. Estabrooks CA, Midodzi WK & Cummings GG, The Impact of Hospital Nursing Characteristics on 30-Day Mortality, Lippincott Williams & Wilkins journals, available, 2005. At: <http://journals.lww.com>.
- [14]. Kuniavsky M, Ganz FD, Linton DM & Svirni S, The legal guardians' dilemma: Decision making associated with invasive non-life-saving procedures. U.S. 2012, National Library of Medicine, available at, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3467171/>
- [15]. Al Sultani H, Evaluation of nurses' practice toward coronary artery bypass grafting patient in intensive care unit in Baghdad city, Master thesis, University of Baghdad College of Nursing, 2006.
- [16]. Hassan SM & Hassan HS, Effectiveness of nursing education program on nurses knowledge toward Arrhythmia in Kirkuk's teaching hospitals, 2013 available-online-<http://www.uokufa.edu.iq/journals/index.php/kjns/article/view/2267>
- [17]. Anders S, Miller A, Weinger MB, Evaluation of an integrated graphical display to promote acute change detection in ICU patients. U.S. National Library of Medicine, available (2012) at: <http://www.ncbi.nlm.nih.gov/pubmed/2253409>.
- [18]. Buckley, and Andrews, Intensive care nurses' knowledge of critical care family needs. U.S. National Library of Medicine, 2011, available at, <http://www.ncbi.nlm.nih.gov/pubmed/21868224>.

Layth A. K. Al-Tameemi. "Effectiveness of An Instructional Program on Nurses' Knowledge Regarding Nursing Follow Up to Weaning From Mechanical Ventilation in Intensive Care Units in Baghdad Teaching Hospitals." IOSR Journal of Nursing and Health Science (IOSR-JNHS), vol. 6, no. 4, 2017, pp. 01-07.