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The Effectiveness of an Educational Program on Nurses' Knowledge about Early Prediction of Acquired Weakness in the Intensive Care Unit

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Objectives: To **e**valuate nurses' knowledge about early prediction of aw-icu for critical patients and determine effectiveness of the educational program about early prediction of AW-ICU.

Methodology: Using in current study Pre-experimental design (static group comparison) which attained through the pre and post-tests method for study sample, the participants are nurses in the intensive care unit at Al Zahraa Teaching Hospital and Al Karama Teaching Hospital in Al-Kut City, the study period from January 2nd, 2022, to May 31st, 2023. The sample select as non-probability sampling method consists of (52) nurses was selected purposively from study population which is composed of (61) nurse based on the study criteria and after obtains verbal and written consent permission from them. The sample divided into groups study group was shown the educational program while the control group was not exposed to the educational program. Constructed program according to Medical Research Council Score for muscle power (MRC-Scale) and study instrument adapted from MRC scale which consists of (20) items for evaluation nurses' knowledge. The validity of instrument by experts and reliability by test-retest, analysis of the result by used descriptive and inferential data analysis throgh (SPSS) version 23

Results: The results of the current study showed that most of the study sample (nurses) poor knowledge for determine or prediction the AW-ICU for critically ill patients. Show that there were statistical differences between pre-test and post-test for study group after implemented program on nurses at value of $p \leq 0.05$.

Conclusion: The educational program was effective as it improved the nurses' knowledge towards early prediction of acquired weakness for critically ill patients in the intensive care unit.

Recommendations: The study recommended applying the program in health organizations to enable nurses in predicting or identifying acquired weakness in the intensive care unit for critically ill patients.

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فاعلية البرنامج التعليمي على معارف الممرضين اتجاه التنبؤ المبكر بالضعف المكتسب في وحدة العناية المركزة

المستخلص:

الأهداف: تقييم معارف الممرضين حول التنبؤ المبكر لضعف المكتسب في وحدة العنايه المركزه لمرضى الحالات الحرجه وتحديد فعالية البرنامج التعليمي حول التنبؤ المبكر للضعف المكتسب في وحدة العنايه المركزه

المنهجيه: استخدام التصميم ما قبل التجريبي في الدراسة الحالية (مقارنة المجموعة الثابتة) والذي تم تحقيقه من خلال أسلوب الاختبار القبلي والبعدي لعينة الدراسة ، والمشاركون هم ممرضون في وحدة العناية المركزة في مستشفى الزهراء التعليمي في مدينة الكوت ، فترة الدراسة من ٢ كانون الثاني ٢٠٢٢ إلى ٣١ ايار ٢٠٢٣. العينة المختارة بطريقه غير احتمالية لأخذ العينات والذي تتكون من (٥٢) ممرضً تم اختيارهم بشكل مقصود من مجتمع الدراسة الذي يتكون من (٦١) ممرضا مقسمين الى مجموعتين هما مجموعة الدراسه والمجموعه الضابطه حيث مجموعة الدراسه يعرض عليها البرنامج التعليمي بينما المجموعة الضابطة لم يعرض للبرنامج التعليمي عليها. تم بناء البرنامج التعليمي بالاعتماد على مراجعة الادبيات .كانت أداة الدراسه جاهزه تم اخذها من مقياس قوة العضلة حيث اختبرة لها الصلاحية والموثوقية (الاختبار-وأعادة الاختبار) حيث تتكون االاداة من (٢٠) فقرة لتقيم معرف الممرضين حوله التنبوء المبكر بالضعف المكتسب في وحة العنايه المركزه.حيث تم تحليل البيانات بواسطو برنامج spss النسخه 23 بتسخدام التحليلي الوصفي والاستنتاجي.

النتائج: أظهرت نتائج الدراسة الحالية أن معظم عينة الدراسة (الممرضون) معارفهم ضعيفه لتحديد أو التنبؤ بالضعف المكتسب لمرضى الحالات الحرجه في وحدة العناية المركزة. ومن خلال تطبيق البرنامج تبين وجود فروق ذات دلالة إحصائية بين الاختبار القبلي والبعدي لمجموعة الدراسة بعد تنفيذ البرنامج على الممرضين عنده قيمه احتماليه اقل من 0.05.

الاستنتاج: كان البرنامج التعليمي فعالاً حيث حسّن معارف الممرضات نحو التنبؤ المبكر بالضعف المكتسب للمرضى ذوي الحالات الحرجة في وحدة العناية المركزة.

التوصيات: أوصت الدراسة بتطبيق البرنامج في المؤسسات الصحية لتمكين الممرضات من التنبؤ أو تحديد الضعف المكتسب في وحدة العناية المركزة للمرضى ذوي الحالات الحرجة.

الكلمات المفتاحيه: فاعلية البرنامج التعليمي, معارف الممرضين ,الضعف المكتسب , وحدة العنايه المركزه

Introduction

Acquired weakness in the intensive care unit (AW-ICU) is one of the complications for critical ill patients in ICU. AW-ICU occurring approximately 13-20 million people worldwide who receive ICU care **(1)**.

AW-ICU occurring due to prolonged stay in the ICU, mechanical ventilation, deferent ICU-Medications such as sedations with analgesic, early parenteral nasogastric tube [(2)].

AW-ICU which effected on autonomic nervous system and cranial/facial muscles are relatively unaffected by the syndrome, which is characterized by weakness in the extremities and respiratory muscles [(3)].

AW-ICU reduced by starting early rehabilitation, regardless of mechanical ventilation. Can predict or determine by three techniques are available such as: Manual muscle testing, Electrophysiology, and Muscle or Nerve tissue biopsy [(4)].

The study conduction in Patel Hospital at Malawi city for determine AW-ICU by Manual muscle test depending on medical research council (MRC-Scale) for muscle strength. the which evaluating the peripheral muscular power in the upper and lower extremities using ranging from 0 to 5 scores [(5)].

MRC-scale was first published in 1943 in a document called Aids to the Investigation of Peripheral Nerve Injuries. This became a standard text resource which was reprinted

many times, and is referred to widely in a number of documents and papers. In the 1970s the document was republished with the title 'Aids to the Examination of the Peripheral Nervous System [6].

A study was conducted at King Abdul-Aziz Hospital. It was a descriptive study to measure the nurses' knowledge of the acquired weakness of critically ill patients, as their knowledge was found to be little, so the study was recommended the nursing staff needed training courses for improve knowledge [7]. It was observed that the complications of acquired weakness decreased after conducting training programs for medical staff on how to prevent acquired weakness in critically ill patients, and it was by 57%. This study was conducted at Al-Joud Governmental Hospital in the city of Khartoum [8].

The current study aims to determine the effectiveness of the education program on nurses' knowledge about early prediction of acquired weakness in the intensive care unit.

Methodology

Using in current study Pre-experimental design (static group comparison) which attained through the pre and post-tests method for study sample, the participants are nurses in the intensive care unit at Al Zahraa Teaching Hospital and Al Karama Teaching Hospital in Al-Kut City, the study period from January 2nd, 2022, to May 31st, 2023.

A purposive (non-probability) sample of (52) nurses was selected for the purpose of the study, they were divided into two groups, each one include (26) nurse as a study a control groups. Only the study group was exposed to the education program.

Constructed education program depended on litreture review and the study instrument adapted from MRC-Scale for evaluation nurses' knowledge at the pre-test and post- test. The validity for instrument through (20) experts who have more than 5 years of experience in their specialties and reliability by (test-retest) was Cronbach alpha (0.85). the instrument consist (20) items for evaluation nurses knowledge concerning early prediction of AW-ICU.

Analysis of the result by used descriptive and inferential data analysis throgh (SPSS) version 23. Ethical Considerations Consent was obtained from Al-Zahra Hospital, as well as written consent from the participants in the current study.

Results:

Table 1. Evaluation Nurses' Knowledge about Early Predication for Acquired Weakness in ICU at the pre and post-Test Periods for the Study Group

N	Items	Pre Test study						Post-test study					
		True		False		Mean	Ass.	True		False		Mean	Ass.
		F.	%	F.	%			F.	%	F.	%		
1	What is the meaning acquired weakness in the intensive care unit (ICU-AW)	2	7.7	24	96.2	1.08	poor	26	100.0	0	0.00	1.33	good
2	Different forms of Acquired weakness in intensive care unit	1	3.8	25	92.3	1.04	poor	24	92.3	2	7.7	1.29	good
3	Acquired weakness in intensive care unit occurs more often to patients with	2	7.7	24	96.2	1.08	poor	25	96.2	1	3.8	1.32	good

4	Incidence rate of acquired weakness in intensive care unit for critical patient	2	7.7	24	92.3	1.00	poor	25	96.2	1	3.8	1.31	good
5	Acquired weakness in intensive care unit (AW-ICU) is	1	3.8	25	92.3	1.54	good	26	100.0	0	0.00	1.08	poor
6	Pathophysiology of acquired weakness in intensive care unit depended on	7	26.9	19	96.2	1.08	poor	24	92.3	2	7.7	1.08	poor
7	Factors which reduce acquired weakness are	5	19.2	21	73.1	1.08	poor	26	100.0	0	0.00	1.08	poor
8	From clinical feature of acquired weakness in intensive care unit (AW-ICU)	6	23.1	20	80.8	1.04	poor	25	96.2	1	3.8	1.29	good
9	Physical rehabilitation should be beginning from	2	7.7	24	76.9	1.27	poor	22	84.6	4	15.4	1.32	good
10	Acquired weakness in intensive care unit due to	8	30.8	18	92.3	1.19	poor	23	88.5	3	11.5	1.31	good
11	From important methods for diagnosis acquired weakness in intensive care unit.	2	7.7	24	69.2	1.23	poor	23	88.5	3	11.5	1.08	poor
12	Severity of acquired weakness depending on	5	19.2	21	92.3	1.08	poor	21	80.8	5	19.2	1.29	good
13	Medical research council Scale of muscle power (MRC) is	5	19.2	21	80.8	1.31	good	25	96.2	1	3.8	1.32	good
14	From long term complications of acquired weakness in intensive care unit.	1	3.8	25	80.8	1.08	poor	26	100.0	0	0.00	1.31	good
15	From short term complication of acquired weakness in intensive care unit	2	7.7	24	96.2	1.19	poor	23	88.5	3	11.5	1.08	poor
16	AW-ICU is an important complications that contributes to functional disability and decreased quality of life in ICU survivors.	5	19.2	21	92.3	1.19	poor	24	92.3	2	7.7	1.29	good
17	Can prevent (AW-ICU) by Changes in sedation	3	11.5	23	80.8	1.04	poor	22	84.6	4	15.4	1.32	Good
18	strong of acquired weakness depending on age	5	19.2	21	92.3	1.08	poor	21	80.8	5	19.2	1.29	good
19	AW-ICU from complications that ICU	5	19.2	21	92.3	1.19	poor	24	92.3	2	7.7	1.29	good
20	Can increase (AW-ICU) by Changes in sedation	3	11.5	23	80.8	1.04	poor	22	84.6	4	15.4	1.32	Good
	Total				**93.2**				**88.0**				

F= Frequency, **%**= Percentage, **ass**= assessment, **Level of assessment**= poor knowledge ≤ 1.3 good knowledge ≥ 1.3

Table 1 shows that the practical knowledge of nurses about early predication of acquired weakness in ICU was 93.2% is incorrect answer at pre-test at study group, while the correct of total knowledge of them was improved to 88.0% after apply program.

Table 2. Evaluation Nurses' Knowledge about Early Predication for Acquired Weakness in ICU at the pre and post-Test Periods for the Control Group

N	Items	Pre Test control						Post-test control					
		True		False		Mean	Ass.	True		False		Mean	Ass.
		F.	%	F.	%			F.	%	F.	%		
1	What is the meaning acquired weakness in the intensive care unit (ICU-AW)	2	7.7	24	96.2	1.08	poor	26	100.0	0	0.00	1.00	poor
2	Different forms of Acquired weakness in intensive care unit	1	3.8	25	92.3	1.04	poor	24	92.3	2	7.7	1.54	good
3	Acquired weakness in intensive care unit occurs more often to patients with	2	7.7	24	96.2	1.08	poor	25	96.2	1	3.8	1.08	poor
4	Incidence rate of acquired weakness in intensive care unit for critical patient	2	7.7	24	92.3	1.00	poor	25	96.2	1	3.8	1.08	poor
5	Acquired weakness in intensive care unit (AW-ICU) is	1	3.8	25	92.3	1.54	good	26	100.0	0	0.00	1.04	poor
6	Pathophysiology of acquired weakness in intensive care unit depended on	7	26.9	19	96.2	1.08	poor	24	92.3	2	7.7	1.27	poor
7	Factors which reduce acquired weakness are	5	19.2	21	73.1	1.08	poor	26	100.0	0	0.00	1.19	poor
8	From clinical feature of acquired weakness in intensive care unit (AW-ICU)	6	23.1	20	80.8	1.04	poor	25	96.2	1	3.8	1.23	poor
9	Physical rehabilitation should be beginning from	2	7.7	24	76.9	1.27	poor	22	84.6	4	15.4	1.08	poor
10	Acquired weakness in intensive care unit due to	8	30.8	18	92.3	1.19	poor	23	88.5	3	11.5	1.00	poor
11	From important methods for diagnosis acquired weakness in intensive care unit.	2	7.7	24	69.2	1.23	poor	23	88.5	3	11.5	1.54	good
12	Severity of acquired weakness depending on	5	19.2	21	92.3	1.08	poor	21	80.8	5	19.2	1.08	poor
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14	From long term complications of acquired weakness in intensive care unit.	1	3.8	25	80.8	1.08	poor	26	100.0	0	0.00	1.04	poor
15	From short term complication of acquired weakness in intensive care unit	2	7.7	24	96.2	1.19	poor	23	88.5	3	11.5	1.27	poor
16	AW-ICU is an important complications that contributes to functional disability and decreased quality of life in ICU survivors.	5	19.2	21	92.3	1.19	poor	24	92.3	2	7.7	1.19	poor
17	Can prevent (AW-ICU) by Changes in sedation	3	11.5	23	80.8	1.04	poor	22	84.6	4	15.4	1.23	poor

18	strong of acquired weakness depending on age	5	19.2	21	92.3	1.08	poor	21	80.8	5	19.2	1.08	poor
19	AW-ICU from complications that ICU	5	19.2	21	92.3	1.19	poor	24	92.3	2	7.7	1.31	good
20	Can increase (AW-ICU) by Changes in sedation	3	11.5	23	80.8	1.04	poor	22	84.6	4	15.4	1.08	poor
	Total		**92.2**						**91.0**				

F= Frequency, **%**= Percentage, **ass**= assessment, **Level of assessment**= poor knowledge ≤ 1.3 good knowledge ≥ 1.3

Table 2 showed that most of the answers were incorrect concerning knowledge for early predication acquired weakness in intensive care unit in the pre-test for the control group, as it was 92.2%, as well as the same of the answers as it was correctly at 91.0% they are in the post-test despite the passage of a certain time, as well as their knowledge does not improve.

Table 3 Overall Evaluation Nurses' Knowledge about Early Prediction Acquired Weakness in Intensive Care Unit at the Pre and Post-test Periods for the Study and Control Groups

Level of knowledge	**Study group**			**Control group**		
	poor	**fair**	**good**	**poor**	**fair**	**good**
Pre-test	20 (100%)	0 (0.0%)	0 (0.0%)	19 (97.0)	0 (0.0)	0 (0.0)
Post-test	0 (0.0%)	0 (0.0%)	20 (100%)	1 (1%)	0 (0.0)	0(0.0)

Poor= (5-10), **fair**= (10-15), **good**= (15-20)

Table 3 shows most nurses in intensive care unit have poor knowledge in pre-test for study and control group, while observed most nurses in ICU good knowledge in posttest specific in study group after implementation program.

Table 4. Statistical Differences between Pre and Post-Test for the Study and Control Groups for Nurses' Knowledge about Acquired Weakness for Educational Program

Test	**Mean**	**S.D**	**t-value**	**d.f**	**p≤ 0.05**	**Sig**
Pre-test of study group	1.1244	.07146	46.300	25	0.000	**HS**
Post-test of study group	1.9295	.05837				
Pre-test of control group	1.0885	0.19089	.8770	25	.3890	**NS**
Post-test of control group	1.1244	0.07146				

M= Mean, **SD=** Standard deviation, **t=** t-test, **df=** Degree of freedom, **Sig=** Significance, **p=** Probability value, **HS=** Highly significant, **NS**= Non- significant.

Table 4 presenting effectiveness of educational program toward early prediction the AW-ICU by Pre and Post-Test for the Study at p≤ 0.05

Discussion

The results of the study showed that most of the nursing staff had almost no knowledge about acquired weakness in the intensive care unit, at a rate of 93.2%, in pre-test for control and study group and their tests were incorrect. This is consistent with a study conducted in Malawi stating that nurses have little knowledge regarding the weakness caused by MS + SD = 34.5 + 67 after implemented the educational program see improve level of knowledge at 88.0% in the post-test of the study group, this indicates on the effectiveness the Program. These findings are consistent with the study conducted in Chania general hospital that reported a significant improvement in nurses' knowledge about reducing complications, weakness acquired

in the intensive care unit after the implementation of the training program [10]. These results are also consistent with the conducted study conduct in US state Where found the study the knowledge and confidence regarding ICUAW and mobility of the participants improved from the pre-test to the post-test, improve nursing knowledge and enhance nursing confidence could help to reduce patient complications and produce positive patient outcomes [11].

The educational program indicated that there is high difference between the knowledge of nurses working in the intensive care unit in the pre and post-tests in relation to the weakness acquired in that unit for critically ill patients, where the percentage of their incorrect answers was 90% in the pre-test, while it was **p≤ 0.05** (0.00) [12]. This result agreement with other study conducted in kantaki hospital that observed high gab between medical staff in pre-test and post-test [13]. These findings are consistent with the study conducted in teaching hospitals in the Southwestern Nigeria is low, this highlights the need for specialized training of ICU nurses about ICUAW to enhance prevention and early detection [14]. The results of the study are similar to a study conducted in a medical center in the Netherlands, where it was found that most nurses need training programs regarding acquired weakness in the intensive care unit after they were subjected to the pre- and post-test of applying the program [15].

These results are consistent with the study conducted at Egypt General Hospital, where it was found that there was no difference between the pre and post-test of the control group, but there was a significant difference in the study group at (M. S=46.78, S. D= 0.956) [16].

Conclusion

The educational program was effective as it improved the nurses' knowledge towards early prediction of acquired weakness for critically ill patients in the intensive care unit.

Recommendations

The study recommended applying the program to all health institutions to assist nurses in predicting or identifying acquired weakness in the intensive care unit for critically ill patients.

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