Original Article

Impact of Nursing Intervention Protocol on the Incidence of Intensive Care Syndrome among Critically ill Patients at Cairo University Hospitals

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ABSTRACT

OBJECTIVE: To assess the impact of a nursing protocol of actions on the incidence of Intensive Care Syndrome (ICS) among critically ill patients.

METHODOLOGY: The study was conducted at Emergency Hospital ICUs affiliated with Cairo university hospitals from April 2020 to December 2021. The study's five research hypotheses were formulated "Critically ill patients who will receive the designed nursing intervention protocol will have; a decreased frequency of (ICS), improved knowledge & practices level regards (ICS), decreased depression, anxiety, and delirium. A quasi-experimental (one group pretest-posttest) research design was utilized. A convenient sample of 31 critically ill adult patients participated in the current study. A nursing intervention protocol as an independent variable includes "early mobility, Range of motion exercises and enhancing patient knowledge through effective communication". Patients have assessed pre-intervention then, and then daily follow-up from day four to seven before discharge. Assessment sheets of intensive care syndrome were used for data collection.

RESULTS: Three hypotheses were supported as there is a significant statistical difference before and after implementation of the intervention protocol regarding knowledge (p .00), practice (p .00), and delirium scores (p =.001); however, the other two hypotheses can't be supported as there were no significant statistical differences regarding depression and anxiety scores after implementation and ICS incidence.

CONCLUSION: implementing the nursing intervention protocol can improve critically ill patients' functional and cognitive outcomes after having a critical illness.

KEYWORDS: Intensive Care Syndrome, Early Mobility, Delirium, Nursing Intervention Protocol, Critically Ill Patients.

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INTRODUCTION

While ICU patients' short-term results have improved considerably over the last half-century, it is becoming increasingly clear that many ICU survivors have physical and cognitive deficits that linger long beyond their initial stay. Anxiety, despair, and post-traumatic stress disorder (PTSD) are common psychiatric sequelae among ICU survivors and their family members[1].

Post-intensive care syndrome (PICS) can manifest as any combination of these physical, emotional, and cognitive symptoms. It might be new difficulties or worsening problems before the severe illness. PICS affects patients treated and received care in or outside the ICU. A person's chance of having PICS may also be increased by certain diseases and events that occur in the hospital[2].

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Delirium has been linked to an increase in morbidity, mortality, duration of stay in the ICU, and long-term cognitive damage since it is one of the cognitive issues. As a result, it must be assessed and identified[3].

Patients with severe illnesses or in intensive care should be examined for the extent of their physical, emotional, and cognitive impairments and their need for physical and occupational treatment, which should include indicators of anxiety, depression, PTSD, or cognitive issues. The daily ICU checklist and the ABCDEF bundle (daily evaluation of pain, analgesia, sedation, release from mechanical ventilation, delirium, mobility, and family participation), as well as nutrition and sleep, should be used[4].

ICU patients must be mobilized and exercised as soon as possible. Nonetheless, the nursing staff is overworked, and institutions must be prepared to assist nursing teams with additional staff members who can help with early mobility while reducing the

danger of falling. Family engagement needs frequent organized contact from ICU physicians and, where necessary, the utilization of translation services[1].

Raising awareness and education, understanding and addressing practice barriers, and identifying research gaps and resources are essential to improve care for intensive care survivors and their families. Survivors' and families' outcomes (Physical, cognitive and Psychological problems) should be enhanced by developing strategies[5].

Therefore, this study aimed to examine the impact of nursing intervention protocol on the incidence of Intensive Care Syndrome (ICS) among critically ill patients. To achieve the aim of the study, the following research hypotheses were formulated:

1. Critically ill patients who will receive the designed nursing intervention protocol will have an improved intensive care syndrome knowledge score.
2. Critically ill patients who will receive the designed nursing intervention protocol will have an improved early mobility and ROM practice score.
3. Critically ill patients who will receive the designed nursing intervention protocol will have a decreased hospital depression and anxiety score.
4. Critically ill patients who will receive the designed nursing intervention protocol will have a decreased level of delirium.
5. Critically ill patients who will receive the designed nursing intervention protocol will have a decreased frequency of ICS signs & symptoms than their pre-intervention frequencies.

METHODOLOGY

A quasi-experimental (one group pretest-posttest) research design was utilized in this study. Before and after the procedure was implemented, the dependent variable was measured in one group of participants.

Thirty-one adult male and female critically ill patients with the following inclusion criteria; patients who are fully conscious & within the first 48 hours of admission and expected to have ICU stay ≥ one week. While the exclusion criteria were a history of mental disease, signs of intensive care syndrome, mechanically ventilated, sedated, and terminally ill.

Assessment sheets of intensive care syndrome among critically ill patients at Cairo University Hospitals were the tool used to collect data pertinent to the current study. It consists of seven significant sections; four were constructed by the researcher and reviewed by a panel of three experts in the field of nursing (critical care nursing and Psychiatric health nursing) and three experts in critical care medicine as a jury committee.

Content validity was done to determine the extent to which the tools employed measure what was meant to be measured. A panel of five critical care nursing and medical professionals reviewed the tools to see if they were clear and appropriate for achieving the present study's goal.

In terms of the data collection tools' reliability, a pilot study done before data collection indicated significant changes to the research tools. The internal consistency of the tools was tested using Cronbach's alpha test, which came out to 0.75, which is acceptable.

Ethical Considerations: The ethics committee of Cairo University's Faculty of Nursing gave their first permission. After the data gathering was completed, final approval was acquired. Official permission to perform the study was also secured from hospital management. Participation in the study was entirely voluntary, and everyone had the option to withdraw at any time. The subjects gave their informed permission. Anonymity and confidentiality were ensured by coding the data, and individuals were promised that their information would only be used for research purposes.

Procedure: In the initial recruitment phase, selecting eligible subjects according to inclusion and exclusion criteria, the purpose and nature of the study were explained to the subjects, and getting informed consent from the selected participants was done. Regarding the implementation phase, each patient was approached individually in two to three sessions to conduct the protocol's theoretical part. Each session lasted from 30-60 minutes according to the patient tolerance. These sessions focused on explaining the theoretical part's aim, objectives and academic content of the intervention protocol.

The practical part of the session was initiated by demonstrating the range of motion (ROM) exercises. After completing ROM exercises, the researcher started practicing early mobility protocol steps. After finishing the practice sessions, the patient, relative, and assigned nurse were advised to practice the simple previous exercises and frequently step according to patient tolerance and strength. Each patient was supplemented with the illustrated Arabic booklet as a reference, including the needed theoretical and practical contents. Then patients were reviewed daily to reinforce the acquisition of knowledge and skills.

In the evaluation phase, the study subjects were evaluated for practicing ROM and out of bed mobility daily to monitor patient response and correct the incorrect / not done steps/items. The study subjects were assessed for signs and symptoms of ICS, delirium, anxiety, and depression daily from day 4 of admission to the 7^{th} day.

A pilot study was conducted on five subjects to ensure objectivity, clarity, and feasibility of study tools. The pilot study sample was excluded from the actual study sample as a significant modification was made to the study tools and methodology.

The findings of this study were limited to a small

sample size as the total study subjects. Therefore, it may not represent the general population of critically ill patients. In addition, the study was affected by the COVID-19 Pandemic, which involved the target study sample size (reduction from 45 to 31 study subjects). Finally, the study is confined to one geographical area in Cairo, limiting the generalization.

RESULTS

The current study showed that the satisfactory knowledge level before implementation of the designed protocol was 0% and 71% after implementation of the intervention protocol, with a highly significant statistical difference between pre and post-total and subtotal knowledge levels (p .00). **Table I**.

Regarding patient practices, the current study revealed that the level of ROM and early mobilization practices were raised (from 0% to 90.3%) and (from 0% to 87.1%), respectively. All through the five practice assessments with a highly significant statistical difference between practices levels of the study subjects before and after implementation of the designed intervention protocol (P .00). Also, the level of ROM subtotal practices was improved gradually all through the study assessments period with a highly significant statistical difference between practices levels of the study subjects before and after implementation of the designed intervention protocol with P values of (.00).

According to **Table II**, the study findings also concluded that there was no significant statistical difference between depression and anxiety scores of the study subjects before and after the implementation of the designed intervention protocol.

Regarding the Delirium level, post protocol implementation, a percentage of 3.2 revealed delirium status, with a gradual decrement in the sub-syndromal delirium from 71% to 58.1% and a highly significant statistical difference between delirium scores of the study subjects throughout the study period. (p =.001).

Table III revealed that most study subjects (74.2%) had no signs of physical problems before the implantation of the designed protocol. However, by the end of the study period, this percentage was reduced to 51.6% without any significant statistical difference (p: .31). Also, the table shows that the highest rate of reported physical problems was slower movement (47.4%) at day 4, which reduced gradually to 33% at day 7.

In addition, most study subjects (80.6%) had no signs of cognitive problems before the implantation of the designed protocol; however, by the end of the study period, this percentage was reduced to 48.4% without any significant statistical difference (p: .31). Also, the highest rate of reported cognitive problems was inattention, which reached its peak (50%) at day four and then reduced to 43% at days 5, 6, and 7.

As for psychological problems, the results showed that most of the study subjects (93.5%) had no signs before the designed protocol was implemented. However, by the end of the study period, this number had dropped to 38.7%, which is a statistically significant difference (p:.03). Also, the highest percentage of reported psychological problems was a depressed mood, which reached its peak (42.86%) at day 5, then reduced to 36.84% at day 7.

the study findings highlighted that the study results concluded that 35 % of the studied subjects revealed Intensive Care Syndrome signs, which are recorded in patients with physical, cognitive, and psychological problems at the exact time **Chart I**. Thus hypothesis five can't be supported. Finally, the current study's findings revealed that co-occurring ICS problems (physical, cognitive and psychological) were present in 35 % of the studied subjects at the end of the study period. Thus, hypothesis five can't be supported.

TABLE I: TOTAL KNOWLEDGE & PRACTICE LEVEL DURING THE TWO ASSESSMENTS (n=31)

Assessment Items	Pretest		Post-test Day 7		Chi-square test	
Total Knowledge level	**No.**	**%**	**No.**	**%**	**χ2**	**p**
Satisfactory	0	0	22	71	34.1	.00**
Unsatisfactory	31	100	9	29		

Item	Pretest		Post 1 (Day 4)		Post 2 (Day 5)		Post 3 (Day 6)		Post 4 (Day 7)		Chi-square test	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**χ2**	**P**
ROM Practice level												
Satisfactory	0	0	11	35.5	19	61.3	27	87.1	28	90.3	71.64	.00**
Unsatisfactory	31	100	20	64.5	12	38.7	4	12.9	3	9.7		
Early mobilization Practice level												
Satisfactory	0	0	12	39.2	18	57.4	25	80.8	27	87.1		
Unsatisfactory	31	100	19	60.8	13	41.6	6	19.2	4	12.9	75.32	.00**
*Significance level **: p < 0.01*												

TABLE II: DEPRESSION AND ANXIETY SCORES BEFORE AND AFTER IMPLEMENTATION OF THE DESIGNED INTERVENTION PROTOCOL (n=31)

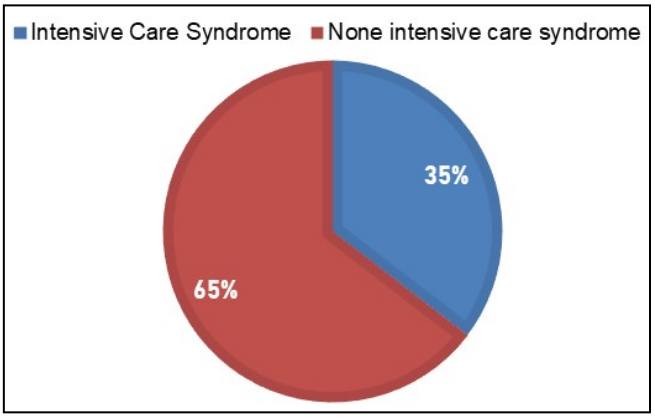
Item	Pretest		Post 1 (Day 4)		Post 2 (Day 5)		Post 3 (Day 6)		Post 4 (Day 7)		Chi-square test	
	No.	%	No.	%	No.	%	No.	%	No.	%	χ2	p
Normal	15	48.4	18	58.1	12	38.7	20	64.5	23	74.2	11.68	.17 N.S.
Borderline case	15	48.4	11	35.5	18	58.1	9	29	7	22.6		
Depression	1	3.2	2	6.5	1	3.2	2	6.5	1	3.2		

TABLE III: PHYSICAL, COGNITIVE AND PSYCHOLOGICAL PROBLEMS BEFORE AND AFTER IMPLEMENTATION OF THE DESIGNED INTERVENTION PROTOCOL (n=31)

Physical problems	Pretest		Post 1 (Day 4)		Post 2 (Day 5)		Post 3 (Day 6)		Post 4 (Day 7)		Chi-square test	
	No.	%	No.	%	No.	%	No.	%	No.	%	χ2	P
Yes	8	25.8	19	61.3	17	54.8	16	51.6	15	48.4	35.3	31 N.S.
No	23	74.2	12	38.7	14	45.2	15	48.4	16	51.6		
Total	31	100	31	100	31	100	31	100	31	100		
Cognitive Problems												
Yes	6	19.4	16	51.6	16	51.6	16	51.6	16	51.6	36.68	.33
No	25	80.6	15	48.4	15	48.4	15	48.4	15	48.4		
Total	31	100	31	100	31	100	31	100	31	100		
Psychological Problems												
Yes	2	6.5	21	67.7	21	67.7	20	64.5	19	61.3	73.58	.03*
No	29	93.5	10	32.3	10	32.3	11	35.5	12	38.7		
Total	31	100	31	100	31	100	31	100	31	100		

*Significance level *; p < 0.05*

CHART I: DEVELOPMENT OF INTENSIVE CARE SYNDROME (n=31)



DISCUSSION

The present study concluded that the satisfactory knowledge level improved after implementation of the protocol with a highly significant statistical difference between pre and post-knowledge levels. Thus, hypothesis one can be supported. Congruently, Mounir EH 2016[6] reported a higher statistically significant difference between patients' knowledge ratings pre- and post-implementation of the nursing educational sessions and suggested that the study group had a higher total mean post-knowledge. In addition, once the nursing instructions were implemented, the study and control groups discovered a statistically significant difference. The influence of information, instructions, and the instructional booklet supplied to the patients might explain the improvement in knowledge scores. The willingness of the research subject to gain information and awareness by following the provided instructions may have also had a factor.

Moreover, the study concluded that the satisfactory practice level improved after the protocol implementation, with a statistically significant

difference between pre-and post-practice levels. Thus, hypothesis two can be supported. This agrees with the study of Mounir EH 2016[6] which found that patients exposed to the nursing discharge plan improved their practice scores.

Furthermore, the current study revealed that subjects were on the borderline of delirium before implantation of the designed protocol; however, the percentage was decreased post protocol implementation, with a highly significant statistical difference between delirium scores of the study subjects before and after the implementation of the designed intervention protocol. Following these results, the study by Balas MC et al.[7] admitted that fewer patients treated with the ABCDE bundle experienced delirium.

From the researcher's point of view, delirium is more common among intensive care patients as they are confined to bed and are exposed to various invasive connections, specific medications, and multiple procedures. Also, Psychological pressures, sleep loss, noise, and other environmental conditions might all be causal factors for delirium among critically sick patients.

The present study showed that the majority of study subjects had no signs of physical problems before implantation of the designed protocol; however, more than half of the study subjects had no signs post protocol implementation, and the main physical problem was slower movement. The findings of this study corroborated those of Rawal G 2017[8] and McWilliams D 2017[11]. They found that at least half of patients discharged from critical care units are unable to return to premorbid levels of activity due to physical weakness and endurance. Disabling weakness and accompanying deficits in physical function in ICU survivors are widespread. In ICU patients, these deficits affect around half of the patients.

On the other hand, a study that included 2686 critically ill patients revealed that more than one-third of the study subjects have an incidence of Muscle weakness. According to the researchers, it might be linked to an interplay between severe illness, extended bed rest and immobility, and subsequent inflammatory processes that limit perfusion.[9]

According to Biehl M 2020[4] physical problems in patients due to intensive care syndrome (up to 80%) include decreased exercise tolerance, fatigue, muscular weakness, dyspnea, and reduced daily activities. The results of our study may highlight the role of implementing the different nursing interventions that may help in decreasing the incidence of physical problems among critically ill patients.

The current study highlighted that most study subjects had no signs of cognitive problems before implantation of the designed protocol; however, more than half of the study subjects had no signs post protocol implementation. In the same way, around a third of the ICU patients develop persistent and ongoing cognitive dysfunction, which supports the current study, which mentioned that more than half of the control subjects showed the occurrence of cognitive symptoms[10].

The current study delineated that the majority of study subjects had no signs of psychological problems before implantation of the designed protocol; however, about two-thirds of the study subjects have no signs post protocol implementation, and the most reported psychological sign is a depressed mood, this highlighted the effect of intervention protocol as it appears in the study conducted by Rawal G 2017[8] reported that about two-thirds of the subjects showed psychological impairment symptoms.

According to the study's findings, it might be linked to the fact that most ICU patients are subjected to unpleasant and painful nursing care tasks and treatments during their stay. Many routines and therapies can threaten patients and cause them to lose control, leading to depersonalization. The combination of psychological distress caused by the sickness and stress created by the surroundings and equipment is also a factor.

CONCLUSION

According to the study, the nurse plays an essential role in the patient's care by assessing the patient's needs and providing the necessary care and teaching. Proper assessment and early prevention strategies for patients to improve their functional and cognitive outcomes after a critical illness are essential for critical care nurses to practice at various intensive care units.

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AUTHOR CONTRIBUTIONS

Elshenawey AMA: Conception, Study design
Morsy WYM: Manuscript drafting, data analysis
Mohamed NMA: Literature review and final review of the manuscript

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