Original Article

The effect of education on the quality of nursing care in ICU patients under mechanical ventilation

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Abstract

Background: In patient care, apart from doctors, nurses also play a crucial role. The study was designed to evaluate the efficacy of using different communication aids while dealing with patients in the ICU and specifically for those undergoing mechanical ventilation. This could help uplift the overall quality of life of all of the patients by taking care of them physically and providing holistic support.

Objective: To evaluate the impact of non-verbal communication between nursing caregivers and patients with critical therapeutic condition, admitted to Intensive Care Unit (ICU) who are under mechanical ventilation, or are intubated due to respiratory failure.

Methods: This study was conducted in the ICU under the cardiothoracic and respiratory department at Apadana hospital in Iran. A randomly selected samples of 20 nurses and 70 patients were included. An observer was appointed to record the interactions, and the observer noted 350 instances of communication. A six-item Likert Scale was used to assess the satisfaction level of the communication in both samples.

Result: Most of the patients were male (70%), and most (60%) of the nurses were female. Approximately 80% of the patients initiated communication with the nurses before the communication skills and communication raids were conducted. A significant rise in response and acceptance was observed in the nursing caregivers. This positive response from the nurses helped the patients to gear up and recover faster.

Conclusions: To improve the overall Quality of Life (QoL) and achieve the ultimate treatment goal. An excellent mental condition is one of the essential factors. To maintain a good mental state for the patients, it is imperative to encourage good communication between the patient and nurses. This study has proven the potentiality of adopting good communication skills and supported making good interactive communication between patients and their nurses, resulting in eradicating the effects of adverse mental conditions on the overall treatment and healing process. [*Ethiop. J. Health Dev.* 2021; 35(4): 397-403]

Keywords: Nonverbal communication; intubated; ventilator; intensive care unit; mechanical; acute respiratory failure; cardiac care facilities.

Introduction

During the recovery process any patient with any disease requires proper treatment and proper systematic intensive nursing care. Treatments are not the same for all conditions. Nursing care also differs according to the needs of the patients (1). Proper nursing is essential to timely fulfill the needs of patients. Thus, the entire concept of nursing is based on communication (2). Though the traditional idea of nursing deals with the patient's clinical and physiological needs, sometimes it is insufficient to heal a person from a long-term clinical condition. Communication plays a pivotal role in assessing the distress, pain, and other symptoms in a patient, which can be dealt with by a nurse and even a doctor in order to treat the patient properly (3-4). Patients admitted to an Intensive Care Unit (ICU) are considered to be in a critical condition, and in most of the cases ICU patients, are unable to communicate verbally, making it difficult to understand their needs Specifically, patients in an ICU under mechanical ventilation are entirely incapable of verbal communication (5). In those cases, the inability to exert their actual feelings and problems to the doctor or the nurses leads to anxiety, fatigue, frustration, hopelessness, depression, and results in loss of control. Despite the skillfulness and knowledge of nurses, they fail to understand the basic needs of these patients due to a lack of communication. Even though a patient's physical needs are being taken care of, the emotional condition of the patient is often overlooked (6). Complete recovery is only possible by correctly addressing the physical needs accompanied by the emotional and spiritual needs. In cases, it has been reported that if the holistic care is being ignored, even with the correct treatment, the recovery phases of the patients are prolonged with aggravated disease status leading to discomfort and depression (7).

In the process of improvement, the Quality of Life (QOL) in any patient, the physical, psychological, social, and spiritual aspects are essential aspects which require attention, and it falls under the primary motto of any treatment (8-9). Reports suggest that due to the lack of verbal communication between the nurse and the patients admitted in to ICU under mechanical ventilation, the nurses either devote very little time to communicate with their critical patients or, apart from following the traditional caregiving rules, they neglect the emotional condition of the patient based on the lack of communication (10). The entire caregiving in these cases depends upon the assumptions, ideas, and previous experiences of the nursing caregiver. Ineffective communication leads to dissatisfaction in both patients and their nurses (11-13).

To fill the communication gap between critical patients with an inability to communicate with the nurses, proper training and knowledge of other conventional communication methods are of utmost

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importance (14). To reduce the negative impact on the recovery of any such critical patient, a nurse should try to establish non-verbal communication with their patient (15-17). In Iran, a study had been conducted to investigate the barriers in the relationship between the nurses and the patients admitted in the cardiac surgery department or for ventilated patients (18). The results of the study was not significant as there was a limitation in case numbers to suggest and implement any definite communicative standards for the nurse-patient relationship. The importance of the communication between the ventilated or critical patient and nurse is evident and further research into other forms of communication for patients and nurses in ICU are necessary.

Materials and Methods

This study was conducted in the Intensive Care Unit under the cardio thoracic and respiratory department, in the ICU at Apadana hospital, Tehran province in Iran, from February to May 2018. It was part of an extensive study to evaluate the difference in the communication quality with and without the aids of communication between the nurse and the patients under intubation. A total of 20 out of 31 nurses were randomly selected depending on selection criteria.

Study inclusion criteria for the sampling of the nurses included: willing to take part in the study; minimum five years of total work experience including minimum one year in ICU; having regular work shifts, i.e., four-day shifts and one night shift, etc. The average age of the participating nurses was 32± 3.54 years and they were primarily women.

Study exclusion criteria for the sampling of the nurses: An intention to quit nursing; intending to change the department in the same hospital; having difficulties in hearing or speech etc.

Study inclusion criteria for the sampling of the patients: a total of 70 patients were taken into account, having 35 each from the Cardiac and Respiratory departments. The participants were selected with their complete willingness. Each of them either had an endotracheal tube or were under full mechanical ventilation, possessing The Glasgow Coma Scale (GCS) score of 11 and above and the Richmond Agitation-Sedation Scale (RASS) score between -3 to +3. The average age of the participating patients was 42 ± 4 years.

Study exclusion criteria for the sampling of the patients: as the study deals with the communication between the patient and nurses so, for selecting the patients, the exclusion criteria included blindness, hearing and speech impairment and also with low Glasgow score -under 11, RASS score > 3 or < -3.

Importance of the RASS score: The level of agitation and sedation is usually assessed using this scale. This scale exhibits the effects of analgesic drugs on the consciousness of the patient. It is a numeric scale of 10-point (+4 to -5). In this study, the patients obtained scores of +4, -4, and -5, respectively (showing violence, significant sedation, and inability to cognitively function, either physical or verbal complications) were excluded from this study.

Importance of the GCS score: This assessment tool is used to demonstrate the level of consciousness level. It is designed to standardize the consciousness indicating observations in patients usually with brain injuries. The scale exhibits three different responses as the measuring factors: eye-opening (E), verbal (V), and motor responses (M); each categorized by various responsive degrees. Each subdivision has a specific number allocated, and the more significant numbers, the better the scores are.

The demographic characteristics of the collected data: included age, gender, marital status, educational qualification, degree of literacy, date of admission and release, cause behind surgery, language, cognitive skills, history of mental distress, a recent history of surgical procedure, GCS score, and RASS score.

The assessment of the study dealt with factors like communicating contents (5 contents), method of communication (4 methods), the overall quality of the transmission, and the initiator of communication (nurse or patient). All these factors were included in a researcher-prepared observation checklist based on literature in behavioral and psychological domains and were acknowledged by the nursing faculties. The factors included under communication were physical necessities, ache, signs and symptoms, emotional responses, decisions of treatment, and queries about the endotracheal tube. The communication methods were mostly non-verbal communication like a head nod, movements exerting expressions, and handwritten requests/responses. Furthermore, the initiator of communication was also included in the checklist of assessment. The checklist was filled during and after the communication took place and in both pre and post-training periods. Moreover, A 6-degree Likert scale was used to evaluate the satisfaction level of the contact between the patient and nurse in ICU (ranging from "completely satisfied" to "not at all satisfied"). The scale validation and approval was done by five experienced (ICU) nursing faculties.

First, the selected nurses were acquainted with the entire procedure of the study, then theconsent forms and demographic information was processed in one session. Second, the patients waiting for surgeries were selected, and after explaining the study objectives and procedures to them, their signatures were collected on the written consent papers, and they then completed the demographic information forms. In post-surgical procedures, the GCS and RASS scales were obtained from the patients, and those satisfying the inclusion criteria were then enrolled in the study. All participants (including the nurses and the patients) received verbal explanations on the research objectives and procedures, and then their signatures were collected on the respective

consent papers on a mandatory basis. Researchers promised to maintain the anonymity and confidentiality for the personal information of the participants.

Appointment of an observer: To mediate the entire study by filling up the forms and the checklists and synchronizing them, one neutral observer was needed. One of the researchers, who was a member of staff, was selected to be the observer for this study. Observations were carried out in different work shifts in order to observe the regular interactive communications between the nurses and patients and to record the responses in the checklist.

This appointment of an observer has two primary drawbacks: 1) The presence of the observer can influence nurses' spontaneity in behavior and their relationship with patients, and 2) a researcher attending several meetings before formal observations may make them a participant as observer according to Gold's Typology of Participant-Observer Roles.

In the study, 70 patients and 20 nurses were recruited. The observer monitored 350 patient-nurse interactions as each nurse had five communication instances with patients which were observed. Satisfaction of patient was observed 12 h post-extubation. Nurse satisfaction was also evaluated after each session.

SPSS software, version 22, was used for statistically analyzing the collected data. To explain the study samples' professional, communication, and demographic features, which included the components like mean, frequency, and standard deviation. Additionally, a T-test, one-way ANOVA, chi-square test was conducted to determine the correlations among the variables. Mann-Whitney U and Wilcoxon non-parametric tests were used to determine the correlation between the patient's satisfaction and demographic parameters.

Table 1. **Characteristics of the selected nurses (n=20) according to the inclusion criteria**

Parameters		Numbers	Percentile representation
Age	Less than 25 years	4	20
	25 to 35 years	10	50
	Above 35 years	6	30
Gender	Female	18	90
	Male	2	10
Years of working experience	1-5 years	6	30
	Five years and more	14	70
Educational qualification	Master of science	2	10
	Above M.Sc.	-	-
	B.Sc.	18	90

Table 2. **Characteristics of selected patients (n=70) according to the inclusion criteria**

Characteristics		Values
	Age	Mean value 42 ± 4
Gender	Male	49
	Female	21
	Marital status	70 (all married)
Educational qualification	Uneducated	20
	Graduate & undergraduate	50
	Academic	4
Substance abuse	Yes	52
	No	18
Surgical procedure	Bypass Coronary Artery Grafting	30
	Valvular surgery	15
	Head surgery	12
	Respiratory surgery	13

Table 3. **Statistical analysis of 350 communicating reports of the interactions between nurses and patients in ICU**

Content	Percentile value
Physical necessities	53.2%
Ache	28%
Expression of emotion	1.3%
Endotracheal Tube Therapy queries	15.3%
Others	2.2%

Table 4. **Frequency distribution of thesatisfaction levels in communication between nurse and patient**

Characteristics	Nurses (n=20)	Patients (n=70)
Extremely	0%	5.8%
Partially	3.8%	8.8%
Low	30.5%	23%
Significantly low	44.8%	53.4%
Not at all	21.0%	9%

Table 5. **Gradation of the fundamental factors on assessing the quality of nursing care given to patients under mechanical ventilation in ICU ward before education**

Basic nursing facilities for patients under ventilation	Scale (Agree) F (%)				
	Strongly agreed	Agreed	Neutral	Disagreed	Strongly disagreed
Patient communication	9(45%)	3(15%)	5(25%)	2(10%)	2(10%)
Proper suctioning	8(40%)	6(30%)	4(20%)	1(5%)	1(5%)
Aseptic techniques compliance	12(60%)	3(15%)	2(10%)	2(10%)	1(5%)
The discharge tube cuff	11(55%)	2(10%)	2(10%)	4(20%)	1(5%)
Thoracic physiotherapy	7(35%)	7(35%)	2(10%)	3(15%)	1(5%)
The properpositioning	11(55%)	3(15%)	3(15%)	1(5%)	2(10%)
Health food gavage	13(65%)	1(5%)	3(15%)	1(5%)	2(10%)
Prevent of foot drop	11(55%)	3(15%)	1(5%)	2(10%)	3(15%)
Oral hygiene	9(45%)	4(20%)	1(5%)	3(15%)	3(15%)
Back rub	12(60%)	3(15%)	1(5%)	2(10%)	2(10%)
Maintaining of optical hygiene and protection of cornea	11(55%)	2(10%)	2(10%)	3(15%)	2(10%)

Table 6. **Gradation of the primary factors on assessing the quality of nursing care given to patients under mechanical ventilation in ICU ward after education**

Basic nursing facilities for patients under ventilation	Scale (Agree) F (%)				
	Strongly agreed	Agreed	Neutral	Disagreed	Strongly disagreed
Patient communication	13(70%)	2 (10%)	1(5%)	1(5%)	2 (10%)
Proper suctioning	14(70%)	2 (10%)	2(10%)	1(5%)	1(5%)
Aseptic techniques compliance	16(80%)	1(5%)	2(10%)	1(5%)	0(0%)
The discharge tube cuff	13(65%)	2 (10%)	2 (10%)	2 (10%)	2 (10%)
Thoracic physiotherapy	14(70%)	2 (10%)	2(10%)	1(5%)	1(5%)
The properpositioning	13(65%)	3 (15%)	2(10%)	1(5%)	1(5%)
Health food gavage	15(75%)	1 (5%)	3(15%)	1(5%)	0(0%)
Prevent of foot drop	16(80%)	1(5%)	1(5%)	1(5%)	1(5%)
Oral hygiene	14(70%)	4 (20%)	1(5%)	1(5%)	0(0%)
Back rub	15(75%)	2 (10%)	2(10%)	1(5%)	0(0%)
Maintaining of optical hygiene and protection of cornea	16(80%)	2 (10%)	2(10%)	0(0%)	0(0%)

Results

The total number of patients was 70, consisting of 21 females, and 49 males (70%). The age range of the patients was 24 to 60 years, with an average of 42 ± 4 years. The majority of the patients (82.8%) had undergone coronary bypass artery grafting surgery. Among 20 nurses, 18 were female, and two were males, who had an age range of 26 to 49 years, with an average of 32±35.54 years. In addition, the mean value of t working experience of the nurses was 3.55±0.98 years at ICU and 7.94±5.82 years in the whole nursing career. Sixteen nurses (80%) had BSc. Degrees and 4 (20%) had MSc. degrees.

According to the observations, before the training, patients initiated 80% of the communications (280/350), whereas nurses only did it in 24.54% (86/350), primarily to follow the traditional practice to examine the level of consciousness and encourage the patients to breath. Accounting for the communication aspects, 53.2% of the communication was reported to be about physical necessities – tasting sensation, oral care, and positioning; 28% was about ache and distress; 1.3% was about other symptoms; even the quires on Endotracheal Tube Therapy was reported as 15.3%, but only 1.3% were related to the patients' feelings like dealing with frustration, anxiety, and fear. Methods primarily used for communication by the patients (88.57%) were non-verbal expressions like hand movements, head nods (10.86%), and purposeful stares; only one patient asked to write down their needs (0.57%). Assistive communication tools, like word and picture boards, were not used.

The satisfaction level analysis of the participants indicated that 0% of the nurses and only 5.8% of the patients were "delighted" with the entire communication during the hospital stay. The nurses indicated reduced overall satisfaction as compared to

the patients. The analysis indicates, 21% of the nurses were not at all satisfied.

The pre-training data analysis indicates that there was no significant relationship established between the work experience in ICU and the level of satisfaction of nurses; the same happened for the patients, the demographic parameters and the satisfaction level of patients were not correlated.

The difference between the satisfactory parameters of prior and post-training indicates a significant change in the attitude of the nurses. The study suggests that the nurses exhibited more interest in initiating communication with patients under mechanical ventilation in the ICU in the post-training period. The checklist analysis suggests that communicating with the patients has helped the nurses improve their overall energy and attention levels. On the other hand, the success of the patient-nurse communication has also immensely helped the patients overcome their mental health, leading to a speedy recovery.

Discussion

Nurses have the most important role among health care workers (HCWs) in each hospital (19). Nowadays, increased quality of the treatment and increase the chances of survival of patients (20). To understand this study, it is necessary to understand the root of the barriers in communicating between the nurses and the intubated critical patients with inabilities in verbal communication. In the patients under ventilation admitted to ICU, it has been evident that more than three fourths of the nurses initiate contact. So, it can be assumed that there must be some problem that the nurses are facing in communicating with the patients admitted to ICU and either under ventilation or in a critical situation. The lack of verbal communication is a serious challenge for the nurses. Though the nurses never fail to provide nursing care to satisfy their physical needs, they somehow ignore initiating contact with these patients. The considerable workload, lack of appropriate communication skills, and lack of communication aids can be the compelling reasons behind this inability to initiate communication on the part of the nurses, despite being skillful, knowledgeable, and experienced. This situation further aggravates frustration in the nurses, which results in dissatisfaction in the nurses. Bastable suggested that patient education can increase patients' satisfaction, improve service quality, reduce patients' anxiety, reduce complications, increase participation in health-care programs, and increase patients' independence in daily activities, which is consistent with the results of the present study (21). Previously sevarl research activities have been carried. The research outcomes highlight the importance of Mechaniacal Ventilation with low Vt in developed countries.

A study on 1905 patients hospitalized in six ICUs in the United States showed that although the mean of Vt was 6.8 (ml/kg PBW), 40% of patients received MV with a Vt of more than 8 (ml/kg PBW) (22). Another study on 433 patients in three emergency departments in the United States revealed that 60.3% of them received protective MV with low Vt (23). The significant effects of the feedback and education intervention might have been due to the focus of this intervention on the existing problems (11) In line with these findings, a study in Netherlands showed that feedback-education for physicians and nurses significantly reduced Vt for patients under MV (25).

It was also found that before the intervention, nurses had limited competence in accurately determining MV parameters. A former study on critical care nurses in South Africa also showed that most of them had limited competence in MV (37). Another study on emergency nurses in Australia showed that they had different levels of confidence and autonomy in using lung protective strategies (22). Although nurses' perceived clinical competence in MV did not significantly change in the present study, their mean score of clinical competence in MV significantly increased after the study intervention. A study in India also showed that education significantly increased nurses' knowledge about ventilator-associated complications (38). Studies on other care-related outcomes also reported the positive effects of feedback and education. For instance, a study in the United Kingdom showed feedback and education improved proper antibiotic choice for patients with hip fracture surgery by 94% (39). Another study showed that feedback and education for nurses during the placement of peripheral venous catheter significantly improved their peripheral venous catheter insertion skill (40). To properly treat the critical patients admitted to ICU, understanding the basic physical needs, distress, discomfort, and pain are the main factors to be addressed with the help of establishing communication. A recent study indicates that only 1.14% of the nurses treating critical patients displayed emotional feelings while treating the patients, which is significantly low. It also revealed that most of the communication was based on physical aspects rather than movement. Other studies suggest that along with the physical caretaking, the emotional health of the patients is essential; otherwise, it may cause anxiety, depression, and frustration in the patients, which will exert a negative impact on the total treatment and recovery phase thus, resulting in a prolonged hospital stay. So, it is clear that the requirement of holistic care is essential along with the physical aspects.

It has been found that each critical patient with the inability of verbal communication exhibits some body language to exert their feelings, like purposeful staring, nodding the head, hand gestures or hand movements, squeezing the hands, etc. These gestures are considered to be the parameters to communicate with critical patients, but without the proper training of understanding these gestures, they are often misinterpreted. With the appropriate training, these parameters can even facilitate communication. Furthermore, in some cases, the use of pen and paper was strategized to establish communication between the nurse and the patient. So, the communication becomes more straightforward and striving with the proper training of the communicating aids and adopting it. The practice of these communicating aids

significantly increases the energy and satisfaction level of both the nurses and the patients (31-33).

Limitations

One of the researchers was among the hospital's nursing staff, so the most significant limitation was the observer's presence during the establishment of relation between the nurse and the patients as the observer's presence can influence the nurse's spontaneity towards the patient.

Another limitation was the size of the sample and the department where the study was conducted. The sample size was not significantly large to come to a final suggestion, and only a very few departments were included in the study. To assess the success of the communicating aids, further research is needed with bigger sample sizes and with different departments.

Conclusion

In the pre-training phase, it was evident that the communication between the nurses and the patients with ventilation under the cardiothoracic ICU was not satisfactory as the entire transmission was either in verbal mode or utterly unfamiliar towards the emotional needs, though the physical conditions were always fulfilled. After the training phase, these issues were mentioned and were being addressed, and the alternative communication aids were taught to the nurses, with indicated a significant rise in satisfaction levels in the inter-nurse-patient relationship. Further research on any sustainable communicating resource to the regular practice of the nurses in treating the patients of ICU requires further research with an unaffected longer follow-up.

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