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Training needs assessment of intensive care nurses in Zabol University of Medical Sciences' Hospitals

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Abstract:

BACKGROUND: The improvement of the knowledge, skill, and attitude of nurses working at the intensive care unit (ICU) through implementing training need assessment and holding continuous in-service training courses are of main requisites for providing better health services to the community. Based on this, in the present work, we are looking for the identification and prioritization of the training need of intensive care nurses in the Zabol University of Medical Sciences' hospitals.

MATERIALS AND METHODS: As a cross-sectional, descriptive study, including two phases of identification and prioritization of training needs of ICU nurses, it was conducted by a close-ended researcher-made questionnaire for collecting the data on training needs from the viewpoint nursing officials, supervisors, and head nurses of the ICU wards in the first phase and a multiple-choice scientific test plus a checklist for measuring the knowledge and skill of the nurses in the ICU in the second phase. In both phases, census method was used for collecting the data. The validity and reliability of data-gathering tools, mentioned above, were tested and verified before gathering data. Data were analyzed with the descriptive statistics.

RESULTS: The results indicated that ventilator setting according to arterial blood gas sampling and interpretation (77.81), cardiac monitoring, detecting dysrhythmia and taking immediate intervention (73.04), ventilator setting according to patient's respiratory status (68.61), airway management, oxygenation and intubation (64.39), and adults cardiopulmonary resuscitation (61.77) were the high-priority training needs of the nurses successively.

CONCLUSION: To improve the quality of training programs and upgrading the knowledge, skill, and attitude of nurses working at ICU, the significance and the weight of each training titles should be determined according to the standards and the continuous in-service training plan along with nurses' training needs and duties.

Keywords:

Assessment, hospital, intensive care, nurses, training

Introduction

The essential role of nurses in providing medical services has introduced them as one of the main members of health-care teams. Nursing discipline is getting more developed along with the other scientific areas and disciplines.^[1] Intensive care units (ICUs) are the sections

in which they play a considerable role.^[2] Having knowledge and a robust scientific background are the substantial features of cader working in the ICUs.^[3]

In spite of unquestionable role of nurses in preventive therapy and achieving desired outcomes, their position in the treatment chain has been neglected.^[4] Despite the

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above-mentioned participants, various studies were indicative of this fact that there are no proper training approaches of nursing for improving the precise skill.^[5] The development and organization of the knowledge and nursing care skills of nurses through continuing in-service training should be considered to maintain their professional nursing standards.^[6]

The necessity of training courses for nurses, especially for ICU nurses, due to the critical nature of ICUs is important and inevitable.^[7] In this regard, identifying the training needs before holding any kind of training courses at different levels and conditions is the first step. Thus, nursing training programs should be based on goals, which could meet their occupational needs, and it is expected that the organizational objectives such as providing better treatment, reducing costs, and increasing employees' satisfaction to be met through training.^[8,9]

In recent years, the need assessment issue in different fields of medical education, specifically in the field of continuous training became prevalent. Hence, that it has been one of the most important research priorities of studies, as well as for Medical Education Development Center.^[10] Some studies focused on training and learning needs as the effective parameters to practice development in the critical care cader. Hard castle surveyed on four main subjects of personal practice, practice quality, learning process, and learning needs as effective education for critical care nursing practice. The results indicated that continuing education and practice development are the essential components of specialist nursing in environments such as critical care and identified work-based learning as a potential strategy for the practice development in critical care nursing.^[11]

Furthermore, some studies showed that training the needs of nurses can manage some vital subjects in the environment. Patient aggression as a general challenge for the nursing patient was studied by the some researchers. The results emphasized on training in handling patient aggression and acquiring self-confidence in dealing with aggressive patients and knowledge about aggression and contributing problems.^[12]

Due to the sensitivity and vitality of nursing occupation which deals with people's lives, continuous training programs should be carefully and appropriately designed for the nursing community. In other words, failing to meet program goals leads to endangering the lives of people, challenging the professional merits, and reducing occupational satisfaction.^[13] Hence, according to the training needs of the intensive care nurses in Zabol hospitals and to prepare them theoretically and practically for working in ICUs, this study concluded to identify and prioritize the training needs of intensive

care nurses in the Zabol University of Medical Sciences' Hospitals.

Materials and Methods

In a cross-sectional and descriptive study at 2019, 30 intensive care nurses from the Emam Khomeini and Amiralmomenin Hospitals of Zabol Medical University were selected by the census method. This study concluded in two phases. In the first phase, the training needs of supervisors and head nurses of ICU wards were assessed.

First, the study approved by the Ethics committee of Zabol Medical University with the number of IR.ZBMU.REC.1398.134 in 2019-12-7. Then, the informed consent was obtained from the participants and within the study period, individuals had enough time to decide if they want to attend in the investigation.

Data collection process

A close-ended researcher-made questionnaire with 28 items was conducted for the collecting of data. The content validity method according to five faculty members of nursing was used for identifying of the validity of the questionnaire. To achieve this goal, the latest scientific topic areas, including books, journals, scientific articles, and organizational job descriptions for nurses, were used to define the training titles of the questionnaire. The Alpha Cronbach's was used to determine the reliability of the questionnaire. The questionnaire reliability from the Cronbach's alpha was calculated ($\alpha = 0.94$). Next, by using the Delphi method, from 15 nursing officials, supervisors and head nurses of the ICU wards asked to rate and scoring of the questionnaire items. From the five-point Likert scale included; "no need for training = 1," "low need for training = 2," "medial need for training = 3," "high need for training = 4," and "urgent need for training = 5" was used for rating and scoring of the questionnaire. Only those training titles with score three, four and five were considered as the training needs and titles with less scores did not accounts.

Within the second phase with regard to the results of the first phase, the training need assessment study conducted by a scientific test to evaluate the knowledge and a checklist to evaluate the skill. Census method, a multiple choice scientific test and an observation checklist, were used to collect the data. The validity of the multiple choice scientific test and the checklist were examined by expert opinion. Moreover, for verifying the reliability of the tool, a test retest with intervals of 10 days was used through a pilot study of eight nurses working in the ICU. Pearson correlation coefficient between the two rounds of multiple-choice scientific tests was calculated 90% and for the twelve checklists the correlation coefficient ranged

from 80% to 97%. Furthermore, the Pearson correlation coefficient for coordination between two investigators ranged from 82% to 95%.

The multiple-choice scientific test included 28 questions, which were conducted based on the result of the first phase (training titles). For each training title, three multiple choice questions were considered. The training titles of multiple-choice questions included (1) providing special nursing care for patients with consciousness disorders such as hallucination, illusion, and physical restlessness, (2) airway management, oxygenation, and intubation, (3) arterial blood gas sampling and interpretation, (4) tests interpretation, (5) planning, implementing, and evaluating the comprehensive skin care program, (6) ventilator setting according to patient's respiratory status, (7) care principles and co-operation in patient weaning, intubation, and oxygenation, (8) cardiac monitoring, detecting dysrhythmia, and taking immediate intervention, (9) setting and applying electroshock, (10) central venous pressure (CVP) and establishing a flow rate of medicines with regards to physician's prescription, (11) positive inotrope administration (adrenalin, atropine, and dobutamine), (12) detecting antidotes, (13) adults cardiopulmonary resuscitation (CPR), and (14) how to prevent the spread of infections in hospitals.

Each question was given one score. About each training title, the score of three or four indicates the existence of training need, and a score of zero or one indicates the lack of training need. Furthermore, 12 checklists were conducted based on the results of the first phase. Each checklist included some items and each item was given a specific score in a way that there was a total score at the end of each checklist. The standard score of each checklist was calculated by Angoff method and a number of key items were included at the end of each checklist. As a result, earning a total score above the standard does not indicate any training needs and below the standard score indicates the related training needs under the subsequent title. Moreover, not doing the right thing about the key items included at the end of each checklist indicates the existence of training need in relation to the checklist.

For gathering the data in the first phase, after co-ordinating with the hospitals' administration headquarters, supervisors, and head nurses of ICU in both hospitals were asked orally to participate in the present study. Then, the purpose of the study and the way of filling the questionnaire were explained to them. After filling all questionnaires, data extracted since them were analyzed. In the second phase, after providing both hospitals' ICU nurses with an explanation of the research purpose and the way of answering the questions, they were asked to participate in the field research through taking part in

the scientific and practical test. Then, the multiple-choice scientific test was taken in both two hospitals. Moreover, the skills of nurses were evaluated by two researchers using 12 checklists designed based on the direct observation of performance method. Then, the training needs of ICU nurses and the frequency of needs for each of 14 training title in the field of knowledge were identified and then prioritized according to the earned score of scientific test. Furthermore, the training needs and their frequencies for each of training titles in the field of skill were identified and prioritized according to the earned scores of observation checklists. In the end, the results of all needs assessment questionnaires, scientific and practical tests were compared with one another. Then, after calculating the relative frequencies, the final results were prioritized. Descriptive statistics and *t*-test were used for analyzing the data.

Results

The results obtained from the first phase showed that most respondents with a frequency rate of 60% belong to the age group of 35–45 years of old with a work history of 15–25 years. Furthermore, 91.67% of them were female and other details are shown in Table 1.

According to the presented results in Table 2, 14 out of 28 training titles which were identified by the Delphi technique were determined as the training needs of ICU nurses working in the two hospitals of Zabol.

The demographic information in the second phase showed that most respondents with the frequency rate of 86.66% were female. Fifty percent of respondents had the age <45 years of olds and 38% of them had an occupational background of 20–25 years.

Table 1: Participants' demographic characteristics in Delphi method

| Characteristics | n (%) |
|--|------------|
| Age | |
| 25-30 | 2 (13.33) |
| 31-35 | 4 (26.66) |
| 36-40 | 6 (40.00) |
| 41-45 | 3 (20.00) |
| Sex | |
| Male | 2 (13.33) |
| Female | 13 (86.66) |
| Work experience | |
| Up to 5 years | 3 (20.00) |
| 5-15 years | 5 (33.33) |
| 15-25 years | 6 (40.00) |
| 25 and higher | 1 (6.67) |
| Responsibility | |
| Hospitals' administration headquarters | 3 (20.00) |
| Supervisor | 7 (46.66) |
| ICU head nurses | 5 (33.33) |

ICU=Intensive care unit

The obtained results obtained from the multiple-choice scientific test, which indicated the relative frequency of the training needs is shown in Table 2.

Ranking of assessed items based on the average scores of the need assessment questionnaire, scientific test, and the practical test was summarized in 14 items, as shown in Table 3.

Discussion

Considering the obtained results, more than 50% of ICU nurses require the training under above-mentioned topic in the field of knowledge and skill. It seems that current in-service training programs are not capable of

providing ICU nurses with the opportunity of improving the knowledge, skill, and awareness at a high level. Moreover, other similar studies conducted in Iran and other countries have illustrated that the abilities and clinical skills of ICU nurses to meet the expectations of patients, health managers, and health-care systems are not sufficient. In one of these researches, approximately 5% of clinical capabilities of graduated students were assessed to be more than the expected level, and almost 85.44% of them met the expected clinical capabilities level, and approximately 9.56% of them had the clinical capabilities under the expected level.^[14]

Similar to our results, the implemented continuous training programs in hospitals and the medical sciences

Table 2: Relative frequency of existence of need assessment and not existence of need assessment based on the result of need assessment questionnaire, scientific test, and practical test (phase-1)

| Number | Training titles | Need assessment questionnaire | | Scientific test (multiple-choice questions) | | Practical test (checklists) | |
|--------|--|-------------------------------|---------------------------------|---|--------|-----------------------------|--------|
| | | E | NE | E | NE | E | NE |
| | | 1 | Patient admission and discharge | 14.83 | 85.17 | | |
| 2 | Monitoring vital signs, respiration, central and peripheral nerves and abnormal cases | 29.029 | 70.971 | | | | |
| 3 | Physical examination | 27.709 | 72.291 | | | | |
| 4 | Determination of the level of consciousness and Glasgow Coma Scale | 28.67 | 71.33 | | | | |
| 5 | Airway management, oxygenation, and intubation | 76.857 | 23.143 | 82.428 | 17.572 | 61.98 | 38.02 |
| 6 | Arterial blood gas sampling and interpretation | 86.16 | 13.84 | 81.24 | 18.76 | 61.839 | 38.161 |
| 7 | Tests interpretation | 58.168 | 41.832 | 28.501 | 71.499 | | |
| 8 | Planning, implementing, and evaluating the comprehensive skin care program | 68.398 | 31.602 | 74.064 | 25.936 | 59.91 | 40.09 |
| 9 | Observe the patients with physical and muscular disorders and diagnosing and preventing from immobility complications | 18.21 | 81.79 | | | | |
| 10 | Patient education about applying artificial devices and ancillary prosthesis | 15.576 | 84.424 | | | | |
| 11 | Decubitus ulcer dressing | 24.89 | 75.11 | | | | |
| 12 | Setting and applying medical equipment | 21.58 | 78.42 | | | | |
| 13 | Patient feeding process through gastric tube and total parenteral nutrition | 26.829 | 73.171 | | | | |
| 14 | Ventilator setting according to patient's respiratory status | 79.101 | 20.899 | 89.892 | 10.108 | 58.71 | 41.29 |
| 15 | Care principles and co-operation in patient weaning, extubation, and oxygenation | 67.199 | 32.801 | 57.156 | 42.844 | 2.96 | 97.04 |
| 16 | Cardiac monitoring, detecting dysrhythmia, and taking immediate intervention | 71.07 | 28.93 | 81.552 | 18.448 | 86.556 | 13.444 |
| 17 | Setting and applying electroshock | 68.91 | 31.09 | 41.72 | 58.28 | 2.616 | 97.384 |
| 18 | Psychological support for patients and their families | 26.208 | 73.792 | | | | |
| 19 | Suctioning through orotracheal, tracheostomy, endotracheal tube, and nasotracheal | 27.288 | 72.712 | | | | |
| 20 | Determination of training and consulting needs of patients and their families and training on self-care | 19.58 | 80.42 | | | | |
| 21 | Evaluating the function of chest tubes, nasal gastric tube, urinary catheter, pacemaker, endotracheal tubes, and types of drains | 33.67 | 66.33 | | | | |
| 22 | CVP and establishing a flow rate of medicines with regard to physician's prescription | 60.97 | 39.03 | 20.748 | 79.252 | 71.829 | 28.171 |
| 23 | Way to prevent the spread of infections in hospitals | 68.016 | 31.984 | 2.97 | 97.03 | 62.414 | 37.586 |
| 24 | Adjusting sensory stimuli to patients sensory threshold | 22.704 | 77.296 | | | | |
| 25 | Special nursing care at the disorders of consciousness, hallucination, illusion, and physical restlessness | 49.329 | 50.671 | 11.712 | 88.288 | 6.219 | 93.781 |
| 26 | Positive inotrope administration (adrenalin, atropine, and dobutamine) | 48.852 | 51.148 | 64.39 | 35.61 | 70.764 | 29.236 |
| 27 | Detecting antidotes | 65.241 | 34.759 | 17.901 | 82.099 | 0 | 100 |
| 28 | Adults CPR | 78.89 | 21.11 | 57.167 | 42.833 | 78.507 | 21.493 |

CVP=Central venous pressure, CPR=Cardiopulmonary resuscitation, E=Essential , NE=NON Essential

Table 3: The average of training need based on the results of need assessment questionnaire, scientific test, and practical test (phase-2)

| Number | Assessed items | Training need | | | | |
|--------|--|-----------------|-----------------|-----------|---------|---------|
| | | Need assessment | Scientific test | Checklist | Average | Ranking |
| 1 | Ventilator setting according to patient's respiratory status | 71.91 | 81.72 | 52.19 | 68.61 | 3 |
| 2 | Arterial blood gas sampling and interpretation | 75.90 | 75.91 | 81.61 | 77.81 | 1 |
| 3 | Adults CPR | 86.70 | 23.10 | 75.51 | 61.77 | 5 |
| 4 | Airway management, oxygenation, and intubation | 52.40 | 76.32 | 64.43 | 64.39 | 4 |
| 5 | Positive inotrope administration (adrenalin, atropine, and dobutamin) | 54.28 | 64.39 | 65.52 | 61.40 | 6 |
| 6 | Planning, implementing and evaluating the comprehensive skin care program | 69.95 | 34.29 | 73.22 | 59.15 | 7 |
| 7 | CVP and establishing a flow rate of medicines with regard to physician's prescription | 65.73 | 21.13 | 81.97 | 56.28 | 8 |
| 8 | Cardiac monitoring, detecting dysrhythmia, and taking immediate intervention | 79.95 | 83.06 | 56.10 | 73.04 | 2 |
| 9 | Care principles and co-operation in patient weaning, extubation, and oxygenation | 68.73 | 37.05 | 2.67 | 36.15 | 10 |
| 10 | Applying electroshock device | 86.14 | 46.36 | 1.21 | 44.57 | 9 |
| 11 | Way to prevent the spread of infections in hospitals | 52.51 | 3.23 | 50.44 | 35.39 | 11 |
| 12 | Special nursing care at the disorders of consciousness, hallucination, illusion, and physical restlessness | 82.22 | 13.01 | 8.21 | 34.48 | 12 |
| 13 | Detecting antidotes | 61.90 | 15.47 | | 25.79 | 14 |
| 14 | Tests interpretation | 57.32 | 27.91 | | 28.41 | 13 |

CVP=Central venous pressure, CPR=Cardiopulmonary resuscitation

universities of Iran revealed that some items such as adults CPR, cardiac monitoring, detecting dysrhythmia and taking immediate intervention, how to prevent the spread of infections in hospitals, airway management, oxygenation and intubation, setting and applying various devices, for example, ventilator and electroshock, arterial blood gas sampling and interpretation, skin care and prevention of decubitus ulcer, and principles of communicating with consciousness disorders patients are the most important training needs of the majority of ICU nurses.^[15]

The results of research implemented by Marshall revealed that training the ICU nurses about cardiac monitoring and detecting dysrhythmias, CPR, intubation, and hospital infections are essential. Furthermore, Washington nurses' association considered the above-declared items as well as other learning skills as constant training with high priority. It is told that these training priorities are considered as international challenges or the international common needs of ICU nurses in the field of nursing continuous training.^[16]

Regarding the results of this study, training needs related to knowledge and skill about hospital infection control were 68.01% and 52.51%, respectively. This fact showed that although the ICU nurses had enough theoretical knowledge, training to develop their practical skills is necessary. Furthermore, according to the last finding, only 39.23% of ICU nurses required training about hospital infection, which appears to be opposed to Marshall's finding. It may be due to the differences

between the research context and the training process of nurses.

Being trained about setting and applying the ICU devices including electroshock and ventilator and setting was identified as one training issue with high priority in a study done by Mohammadian. So that, it was indicated that 43.8% of nurses considered "ventilator setting" as one of their important training priorities.^[17] In spite of current research result about "ventilator setting according to patient's respiratory status" (it has been found to be the second training priority with the relative frequency of 70.80%) and the acceptable training for employing the new device by the hospital's training managers, the training for applying the devices ought to be included in the training agenda of hospital training supervisors as a common training need of nurses. Because it is forgotten how to work with some devices in some hospital wards due to lack of frequent use of a specific device.

Another report released by Kalthori *et al.* showed that the most important skill of ICU nurses is about CPR, and awareness about the newest changes related to CPR protocols is so necessary. As well, positive inotrope administration (atropine, adrenalin, and dobutamine), cardiac monitoring, electroshock therapy, and intubation are further emphasized.^[18] The result of the current research was consistent with the mentioned study.

Numerous researches have been performed regarding of the significance of the pharmacotherapy and injection of drugs with positive inotrope which the

relative frequency was 57.90% in the present study. Nowadays, the importance of safety in health care, particularly in the prevention of medication errors, has been boosted.^[19] Medication error is one of the most fatal complications treatments. So that, a report published by the Commission of Medication Errors in 2004 emphasized on the importance of medication errors and their preventive natures through training plans.^[17] Regarding to the commission reports, medication errors devote 1 out of 5 deaths due to human errors which inflict additional charges to patients and also hospitals. Similarly, it is worth noting that there are lots of cases that are unpublished.^[20]

The results of another study conducted by Nasiriani indicated that the mean scores obtained for the “arterial blood gas sampling and interpretation” and “positive inotrope administration” were 34% and 35%, respectively. Furthermore, their skill related to “applying medical devices such as ventilator and its setting” was evaluated under average with the frequency rate of 8%. These findings revealed that the educational plans provide the opportunities for graduated students to develop their knowledge and skill, but it is not adequate. Therefore, preparing them with in-service training is emphasized.^[21,22]

No study was found with the focus on “CVP and establishing a medicines flow rate with regard to physician’s prescription”. It might be described by two following reasons: (1) the inadequate in-service training programs in the two hospitals of Zabol which is seriously required and (2) the type of hospital that is not specialized. Thus, the number of patients who need that special service and subsequently, increasing the probability of getting face to face with those patients indicates the necessity of improving the practical skill of nurses.

Some limitations of this study were the inability to control of some variables such as boredom and fatigue of the participants, and also the lack of cooperation of some medical emergency staff due to the high workload. Hence, the use of self-learning and the educational package as one of the engagement methods can replace with personal training.

Conclusion

The main goal of continuous in-service training is the professional improvement of the nursing skills in empowering them to meet the needs of patients and strengthening the health-care system. Obviously, achieving this goal requires appropriate training of nurses in the ICU and meeting all their educational needs.

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Conflicts of interest

There are no conflicts of interest.

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