

The effect of time management education on critical care nurses' prioritization: a randomized clinical trial

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Background: Nurses are at the forefront of patient care, and time management skills can increase their ability to make decisions faster. This study aimed to assess the effect of a time management workshop on prioritization and time management skills among nurses of emergency and intensive care units.

Methods: This randomized clinical trial was performed with 215 nurses. The educational intervention about time management was held in the form of a workshop for the intervention group. The time management questionnaire was completed by both groups before, immediately after, and 3 months after the intervention.

Results: Most participants were female (n=191, 88%), with a mean age of 31.82 years (range, 22–63 years). Additionally, the participants' work experience ranged from 1 to 30 years (mean±standard deviation, 8.00±7.15 years). After the intervention, the mean score of time management increased significantly in the intervention group, but no significant difference was observed in this regard in the control group. The results also revealed a significant difference between the intervention and control groups regarding the mean score of time management 3 months after the intervention (P<0.001).

Conclusions: Time management training helped nurses adjust the time required to perform and prioritize various tasks.

Key Words: emergency; intensive care unit; nursing; time management

INTRODUCTION

Currently, with the increasing growth of information and businesses and, consequently, the increase in responsibilities and the resulting stress, the importance of proper time management is becoming more and more apparent. Time management refers to a set of behaviors for the optimal organization and division of time [1]. This set of behaviors leads to better use of time and increased productivity and increases the likelihood of achieving predetermined goals [2]. These behaviors include gaining skills in the areas of goal setting, prioritization, and planning as well as finding ways to reduce the waste of time [3]. Applying these skills is more important among positions with high workloads and responsibilities such as nursing. Nurses, who are an integral part of the healthcare system, face a heavy workload on a daily basis [4]. This workload, time constraints, and the need for making decisions in a limited time necessi-

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tate the application of time management skills [2,3,5]. Proper implementation of these skills facilitates the work of nurses and allows them to perform their tasks more intelligently. Additionally, implementation of these skills not only leads to the provision of better and timely care for patients, but can also reduce nurses' work stress and increase their quality of life [2]. Nurses in intensive care units (ICUs) and emergency departments, in particular, need to implement these skills properly as they are exposed to long lasting job stressors and the challenges of dealing with critically ill patients, heavy workloads, complications, unforeseen events, and shortage of time. Overcoming these challenges requires time management skills, timely and correct decision-making, prioritization, and familiarity with different devices [6-8]. The persistence of these challenges can cause stress and numerous physical and mental traumas for nurses [8,9]. One of the problems in implementing time management skills is that they are not taken seriously and are not properly implemented. One study found that in an eight-hour work shift, 31% of the nurses' time was spent on direct patient care, 45% on indirect care, and the remaining 24% on outpatient and personal work [10]. Personal and non-clinical work are important factors that waste nurses' time and reduces their performance efficiency [11]. These include non-clinical or personal tasks such as unscheduled appointments, frequent phone calls, inadequate day-to-day assignments, not having a weekly or daily schedule, waiting for meetings, and the inability to say no [12].

Despite the importance of nurses' understanding of time management and the need for proper training in these skills, there is a lack of studies on the impact of time management training courses. Thus, the present study aimed to assess the effect of a time management workshop on the prioritization and time management skills among nurses working in emergency and ICUs.

MATERIALS AND METHODS

Design and Setting

The present study was a single-blind, randomized clinical trial with pre- and post-test design. This study was performed in the emergency and adult ICUs in the largest specialized and sub-specialized referral center in southern Iran (Nemazee Hospital, Shiraz, Iran). The emergency department of this hospital includes triage and screening departments, a cardiopulmonary resuscitation room, surgical emergency, acute wards I and II, and eight internal medicine, heart, and neurology

KEY MESSAGES

- Time management is an important part of effective patient care in intensive care units.
- Time management techniques are learnable.
- Time management training helped nurses adjust the time required to perform and prioritize various tasks.

wards. The adult ICU also includes an emergency ICU, two neurosurgery ICUs, a heart surgery ICU, a general ICU, and two internal medicine adult ICUs.

Participants

At the time of the study, 500 nurses were working in the emergency ward and adult ICUs. All the nurses working in these wards who met the inclusion criteria were invited to participate in the research. The inclusion criteria were working in the ICU or emergency ward as a nurse for more than 6 months, having at least a Bachelor's degree, and not having participated in other training programs on time management. The exclusion criteria were reluctance to participate in the study, change of ward during the study, and long-term leaves such as maternity leave.

Data Collection

Considering $\alpha=5\%$ and $\beta=0.15$ and using similar studies [13], a 171-subject sample size was estimated for this study. Considering the probability of loss, 200 nurses were selected using stratified random sampling. Each ward was considered a class. Based on the research population (500 nurses) and the approximate equality of nurses in the emergency ward and ICU (nearly 250 people in each unit) in proportion to the volume of each category, 107 emergency nurses and 108 ICU nurses were randomly selected to participate in the study via lottery. Among these nurses, 108 were allocated to the intervention group and 107 to the control group) (Figure 1).

The study data were collected using a questionnaire consisting of two parts. The first part included demographic and occupational information of the participants such as age, sex, education level, marital status, ward, work experience, and workload (working more than required). The second part of the questionnaire was the Macan Time Management Behavior Questionnaire, which was used in the pre- and post-tests. This questionnaire was developed by Macan and colleagues in 1990, and was chosen due to the inclusion of a list of common

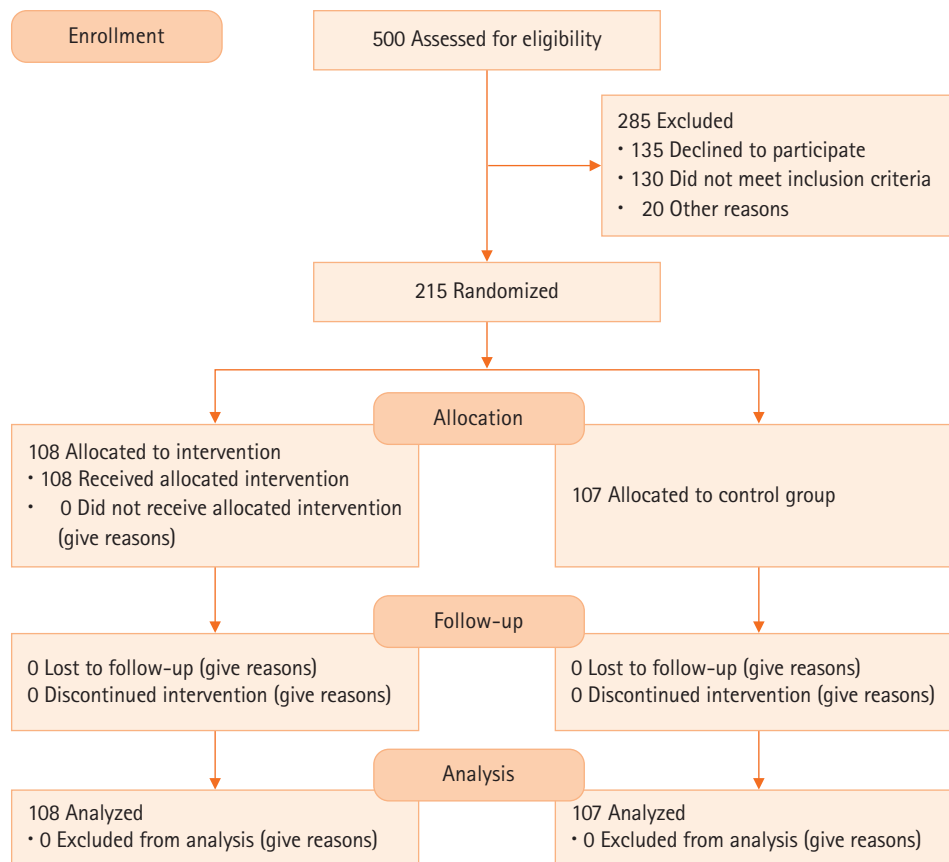


Figure 1. Consolidated standards of reporting trials (CONSORT) flow diagram of participant enrollment.

concepts for time management behaviors as well as being validated and user-friendly. This questionnaire contained 39 items divided into six dimensions, namely goal setting (having specific goals at the beginning of a work shift), goal and activity prioritization (identifying the goals and tasks that are more important and have to be done sooner), operational planning (the extent to which goals are achieved), delegation (assigning some tasks to other colleagues in order to reduce workload and take care of more important tasks), communication management (controlling unnecessary harassment and conversation), and meeting management (attending and finishing meetings at the appointed time). The questions were both positive and negative and could be answered using a 5-point Likert scale ranging from very high to very low. Thus, the score of the questionnaire could range from 30 to 195 [14,15]. The validity and reliability of this questionnaire have been confirmed in various studies. Accordingly, the alpha coefficients for the subscales ranged from 0.5 to 0.9 [16]. Other researchers have also reported on the acceptable validity and reliability of this questionnaire [17]. In addition, the validity and reliability

of this questionnaire have been confirmed in several studies in Iran [18,19].

Intervention

The study was conducted from the second half of July 2018 to January 2019. After selecting the participants and randomly assigning them to the intervention and control groups, informed consent forms were completed by all the participants. Before the intervention (time management workshops), both groups were required to complete the Time Behavior Management Questionnaire. For the intervention group, a time management training session was held in the form of a four-hour training workshop on different dimensions of time management behaviors. With the help of the educational supervisor, the intervention group was divided into three groups based on work shifts, and the time of the workshop was announced to all intervention groups. Because of the large number of intervention groups and the nurses' rotation program that complicated the participation of some staff on certain dates, one of the researchers held the workshop in three shifts with the same

content during 1 month. If a participant was not able to attend the workshop on their specified day for any reason, he/she could attend a workshop held on 1 of the other 2 other days. One of the researchers who had a PhD in nursing education and 25 years of experience in teaching nursing management courses as well as holding workshops in various fields of nursing management arranged the workshop for the intervention group. The content of the workshop included the definition of time management and its importance, practical tips on time management behaviors, time-saving techniques such as a daily activity chart, how to set and prioritize goals based on the prioritization formula, how to implement goals, to whom and how to delegate, how to deal with people who seek out nurses unnecessarily or entrust nurses with extra work that wastes time, using dead times, and managing phone calls. At the end of each section, a short practical task in the form of a case was given to the participants. At the end of the workshop, a scenario about time management of an ICU nurse was presented and the participants and the instructor (who was one of the researchers) discussed the nurse's time management problems and strategies. Additionally, the material was summarized with the help of the participants.

It should be mentioned that both intervention and control groups received their routine continuous medical educational programs. Immediately after the end of the workshop and 3 months later, both groups were required to complete the post-test time management behaviors questionnaire. In observance of ethical principles, the control group received the educational content in the form of an educational booklet after the end of the study.

Ethical Considerations

The present study was approved by the Ethics Committee of University of Medical Sciences (No. IR.SUMS.REC.1395.46). It was also registered in Iranian Registry of Clinical Trials (IRCT) with the registration number IRCT2016080927216N4 on October 31, 2016. All necessary permissions for conducting the research were obtained from the relevant administrators and all methods were performed in accordance with the relevant guidelines and regulations. Furthermore, a session was held after the selection of the participants for explaining the study objectives and procedures. Written informed consent forms were also taken from all the participants.

Data Analysis

After the last post-test, the data were coded and entered

into IBM SPSS ver. 22.0 (IBM Corp., Armonk, NY, USA). The Kolmogorov-Smirnov test confirmed the normality of the data. Therefore, repeated measures were used for comparing the study groups. In addition, the independent t test and chi-square test were used to compare the two groups with regard to demographic and occupational variables as well as quantitative and qualitative data. Pearson's and Spearman's correlation coefficients were used to determine the relationship between the mean score of time management behaviors and quantitative and qualitative demographic and occupational variables. A $P < 0.05$ was considered statistically significant.

RESULTS

Most of the participants ($n=191$, 88%) were female, with the mean \pm standard deviation (SD) age of 31.82 ± 8.02 years (range, 22–63 years; median, 30; interquartile range, 25–37). In addition, 117 participants (54.4%) were single and 205 (95.3%) had Bachelor's degrees. The participants' work experience ranged from 1 to 30 years (mean \pm SD, 8.00 ± 7.15 years). Besides, 184 participants (85.6%) worked normal shifts and 31 (14.4%) did more shifts than their duties (Table 1).

Before the intervention, there was no statistically significant difference between the two groups regarding the mean score

Table 1. Comparison of the general characteristics of the intervention and control groups

Variable	Intervention group	Control group	P-value
Age (yr)			0.940
Mean \pm SD	31.63 \pm 8.38	32.02 \pm 7.68	
Median (range)	30 (24–36)	30 (25–38)	
Work experience	7.62 \pm 7.26	8.38 \pm 7.05	0.445
Sex			0.405
Female	97 (89.8)	94 (87.9)	
Male	11 (10.02)	13 (12.1)	
Education level			0.620
Bachelors	103 (95.4)	102 (95.3)	
Higher	5 (4.6)	5 (4.7)	
Marital status			0.726
Married	48 (44.4)	54 (50.5)	
Single	59 (54.6)	51 (47.7)	
Divorced	1 (0.9)	2 (1.9)	
Shifts			0.824
Required	93 (86.1)	91 (85)	
More than required	15 (13.9)	16 (15)	

Values are presented as number (%) unless otherwise indicated. SD: standard deviation.

for time management behavior ($P < 0.1$). After the intervention and 3 months later, however, statistically significant differences were found in the total score of time management and the three dimensions of goal setting, prioritization of goals and activities, and operational planning. On the other hand, no statistically significant differences were observed between the two groups regarding the three dimensions of delegation, communication management, and meeting management.

After the intervention, the intervention group's total mean \pm SD score of time management increased from 120.38 \pm 6.06 to 132.67 \pm 7.23 ($P < 0.001$). However, the control group's mean score changed from 126.06 \pm 7.60 before the intervention to 126.71 \pm 6.46 after that, which was not statistically significant. Three months after the intervention, a significant difference was observed between the intervention (130.56 \pm 6.85) and control (124.95 \pm 6.61) groups concerning the total mean score of time management ($P < 0.001$). Comparison of the two groups with respect to the total score as well as the mean scores of the model constructs at the three time points has been presented in [Table 2](#).

Pearson's and Spearman's correlation coefficients were used to assess the relationship between the mean score of time management behaviors and demographic and occupational variables. The results revealed no statistically significant relationship between any of the demographic and occupational variables and the mean score of time management behaviors ($P > 0.05$).

DISCUSSION

This clinical trial demonstrated that participating in the time management training workshop had a significant and positive

effect on the time management and prioritization skills of the nurses in the emergency ward and ICUs. There are controversial opinions about the effect of time management training. In a similar study, a significant increase was observed in the implementation of time management skills in the areas of time control and organization among head nurses, while this difference was not significant in terms of time mechanics and goal setting skills [20]. In another study, passing these trainings did not lead to an overall significant difference. These controversies might be attributed to such factors as less frequent training courses, intensive schedule of each course, interference of nurses' shifts, and not repeating these sessions [13]. In a previous review, of the 32 studies on time management, only seven evaluated the effects of training courses, only four of which showed a significant difference in this regard [21]. In another study, the time management training program had a positive effect on the job satisfaction of head nurses [22].

In the questionnaire used in the present study, the items were organized into six sections, namely goal setting skills, prioritization of goals and activities, operational planning, delegation, communication management, and meeting management. It should be noted that this questionnaire is one of the most valid instruments in the field of time management [17]. The current study results revealed a significant difference between the intervention and control groups regarding goal setting skills, prioritization of goals and activities, and operational planning. Other dimensions were found to be nonsignificant in other studies [20]. For example, the areas of goal setting and prioritization of goals were not significantly related, which was explained by continuous training of these skills at lower levels of education and continuous education as well as integration with daily activities [20]. The target community in the current

Table 2. Comparison of the two groups regarding the mean scores of time management behaviors

Dimension	Intervention group			Control group			P-value
	Before the intervention	Immediately after the intervention	3 Months after the intervention	Before the intervention	Immediately after the intervention	3 Months after the intervention	
Goal setting	16.00 \pm 3.55	19.27 \pm 3.75	19.00 \pm 3.42	15.81 \pm 3.55	15.27 \pm 3.75	15.39 \pm 2.49	<0.001
Prioritization of goals and activities	23.50 \pm 3.60	25.00 \pm 3.12	25.20 \pm 4.17	23.10 \pm 3.10	23.30 \pm 3.36	23.66 \pm 2.85	<0.001
Operational planning	25.52 \pm 3.80	28.41 \pm 3.72	28.86 \pm 4.56	25.41 \pm 3.72	26.93 \pm 4.03	27.66 \pm 4.05	<0.001
Delegation	18.04 \pm 2.62	19.58 \pm 2.29	18.37 \pm 2.62	17.00 \pm 2.35	18.99 \pm 2.30	18.64 \pm 2.78	0.300
Communication management	26.22 \pm 3.05	28.08 \pm 2.88	26.71 \pm 4.19	27.1 \pm 3.06	28.00 \pm 2.84	27.50 \pm 2.14	0.700
Meeting management	11.48 \pm 1.98	12.33 \pm 2.21	12.10 \pm 2.19	11.87 \pm 2.04	12.24 \pm 2.21	12.10 \pm 1.50	0.100
Total score of time management	120.38 \pm 6.06	132.67 \pm 7.23	130.56 \pm 6.85	120.29 \pm 7.60	124.43 \pm 6.46	124.95 \pm 6.61	<0.001

Values are presented as mean \pm standard deviation.

research was nurses of emergency wards and ICUs, and thus lack of significant associations in the three areas of delegation, communication management, and meeting management could be justified by the fact that nurses in these vital wards considered their main responsibility to be direct communication with patients. They believed that managing communications and meetings and delegating authority were not as important and were the duties of head nurses or other staff. In this study, the lowest scores of both intervention and control groups were related to the goal setting dimension before intervention (intervention, 16.3; control, 15.81), which showed a significant increase after intervention (intervention, 19.27; control, 15.27). Both groups scored relatively higher from the beginning in the areas of goal prioritization and operational planning (intervention, 23.5 and 25.52, respectively; control, 23.1 and 25.41, respectively). After intervention, an increase in these scores was observed in the intervention group (intervention, 25 and 28.41, respectively; control, 23.3 and 26.93, respectively). The effect of training also remained after 3 months (goal setting, 19.3; prioritization, 25.2; and operational planning, 28.9), indicating the high quality of the training as well as the nurses' eagerness and active participation.

The mean score of the intervention group increased from 128.36 before participating in the training course to 139.67 immediately after participating in the course and 136.22 3 months later, which was significantly higher compared to the control group. Possible factors influencing the final results included the large number of participants in the study, holding multiple courses to cover the interference of work shifts, making use of capable teachers, and active participation of nurses in the courses. Apart from the role of participating in training courses, other factors could also affect time management skills. Researchers in the present study made genuine attempts to control these factors as much as possible. These factors have been explored in various studies on nurses' use of these skills; factors such as work experience and personal characteristics have been shown to affect time management [13,20]. Since there are differing views on the role of sex, age, and level of education [13,23,24], further research on the issue is warranted.

Implications for Nursing Management

The use of practical methods of time management can be the basis for reviewing the guidelines and instructions for treatment and care. Time management and prioritization are important aspects of ensuring effective patient care in ICUs.

Time management techniques are learnable, and nurses may experience lower stress levels while performing their duties on time when they are aware of these techniques.

Conclusion

This study sought to assess the effect a time management workshop on the time management skills of nurses who work in the emergency ward and ICU. The results demonstrated that time management training enhanced the nurses' knowledge of these skills, which could reduce the time required to perform various tasks. Nurses were able to make good use of their limited time in a work shift by learning how to prioritize tasks; plan operational activities; delegate tasks in non-specialist cases; manage communication with patients, colleagues, physicians, and patient companions; and manage sessions. Effective management also resulted in an increase in patient and nurse satisfaction.

Limitations

The present study had some limitations. It was performed only in ICUs and emergency wards in one hospital using a workshop intervention. Thus, the effectiveness of other educational methods such as virtual training is recommended for study because of the limited time nurses have for time management training. Further research in several hospitals is recommended. In the current study, the scores of the study questionnaire ranged from 30 to 195, and the mean scores of the nurses were moderate. Hence, it is necessary to provide a refresher training program to determine the factors affecting time management behaviors and how to control them with quantitative and qualitative methods, so that nurses can overcome problems through time management. Furthermore, future studies are recommended to evaluate the effectiveness of the training course on nurses' performance.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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Conceptualization: FV, MR, RD. Data curation: FV, FS, RD. Formal analysis: FS. Funding acquisition: FV. Methodology: FV, MR. Visualization: FS. Writing—original draft: FV, RD. Writing—review & editing: MR, FS.

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