*Research Article*

# The Effect of a Training Program (Retention) on the Clinical Competence, Self-Efficacy, and Occupational Stress of Undergraduate Students of Anesthesia: The Transition from Studenthood to the Clinical Workforce

*Ali Khalafi, Shahla Assadi Hovyzian, Nooshin Sarvi-Sarmeydani\**

Department of Anesthesiology, School of Allied Medical Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

## ARTICLE INFO

## ABSTRACT

**Background:** Transferring students from university to the workplace due to facing many challenging and stressful factors is one of the important stages that, if the educational authorities do not pay attention, it leads to low efficiency and an increase in the number of resignations from the workplace, which leads to financial and human losses for the system. Purpose: Investigating the effect of a training program on the clinical competence, self-efficacy, and occupational stress of Anesthesiology undergraduate students, in their transition from the studenthood to the clinical workforce.

**Methods:** In this prospective longitudinal semi-experimental study, all final-year undergraduate and newly graduated students of anesthesia studying at AJUMS, Ahvaz, Iran (60 people) were included in the study and were divided into two groups by a simple random method. The intervention consisted of an educational-supportive program called retention that was applied to the intervention group and lasted for 6 months. The required data in both groups were examined by nurses' competence questionnaires (CIRN), stress and job self-efficacy through pre- and post-tests. Chi-square, independent t and paired t tests were used to analyze the data.

**Results:** After the intervention, the two groups were significantly different in terms of clinical competence (P=0.020) and work self-efficacy (P=0.001). The results of the paired t-test of occupational stress in the intervention group showed that the difference between the pre-test and post-test scores was statistically significant. (P = 0.036)

**Conclusion:** Implementation of the intervention (the retention program) in the intervention group was effective in terms of clinical competence, self-efficacy, and occupational stress of the students after graduation.

## Introduction

Today's health systems need expert, capable and efficient people to respond to quantitative and qualitative needs of treatment. In this regard, the mission of universities is to empower students to enter and pursue their career at the patient's bedside [1].

However, when they enter their workplace, newly graduated students seem to have not acquired the necessary skills during their studies, and this impairs their professional preparation for their role as new nurses [2].

According to global statistics, the rate of resignation among nurses who have just graduated [1] and are in the first three months of their work varies between 30 and 60 percent. The students who have just graduated are in a

psycho-social transition phase [2], shifting from the role of student to official workforce. During this transition process, the students face job stress [3] and job adjustment problems due to the differences between what they learned from their university courses and what they actually encounter in the real clinical environment, which is generally known as reality shock or transition shock [3-4].

One of the possible consequences of this stressful situation in graduates is the weakened morale and the poor student performance in the job, eventually leading to reduced quality of care for clients. According to previous studies, the factors affecting the transition shock of students include insufficient preparation for the clinical role, weak management skills, and problems related to the care of critically ill patients. On the other hand, awareness of the challenges associated with this transition helps a person to show more appropriate behavior during this process [4-8].

According to the literature, this lack of balance in the transfer of students to the clinical setting originates from inappropriate clinical training. In their study determining the challenging factors of clinical education from the point of view of the students of operating room technology and anesthesia, Tolyat et al. identified the following factors: inappropriate educational environment and interpersonal communication and humiliating experiences and unpleasant feelings (i.e., the inappropriate treatment of the personnel and medical staff with students and their instructors) in clinical education [1]. Kim et al. investigated the effect of pre-graduation characteristics and working environments on the transition of new nurses. After collecting information from 312 questionnaires, they concluded that one of the most important factors affecting the transition shock is the low self-efficacy of students and that it is necessary to devise educational programs to increase students' self-efficacy [4]. Therefore, scholars and practitioners in clinical education should change their methods and programs in order to reduce the challenging factors. Although the field internship program has been foreseen and implemented in the current curriculum of anesthesia students, according to the results of previous studies, it seems that this program has not been not as effective as it should be. Therefore, a revision of the current clinical curriculum, especially the field internship program, seems necessary. It is obvious that benefiting from the experiences of other countries is of paramount importance in this regard [4,8].

The importance of the field internship course lies in the fact that this program has important effects on the students' adaptation to the clinical environment and selection of their careers. This course can be made more effective by including strategies to increase the retention of students in the work environment. [1]

In the studies that used New Nurse Transition Program (NNTP) to improve the clinical competence of newly graduated students, this program improved the clinical competence of students in terms of their general clinical skills, basic biomedical sciences, ethics, general assessment, and self-efficacy, and it has also been reported to reduce occupational stress [5-8].

Tseng and Hwang investigated the impact of an intervention program called "survival" [6] on nursing abilities, self-efficacy [7], job stress, and job stability [8] of newly graduated student nurses in Taiwan in 2021. Designed based on social-cognitive career theory, the survival program was the research framework for nurses' transition and included an internship program, university curriculum adjustment, career mentorship, and peer support. As a result of this program, the competence, self-efficacy, job stress and job stability of newly graduated students were enhanced [2].

Anesthesia is one of the most important fields of medical sciences, and there is has been a progressive expansion of surgical technologies and anesthesia care in recent decades. Therefore, it is necessary for the students of anesthesia to achieve deeper levels of knowledge and skills in this field in order to be successful in their future clinical careers. However, routine training alone cannot increase the clinical competence of these students, and more specialized courses should be allocated to final year students in order to increase their retention in the workplace after graduation [9]. According to our literature review, no study has been conducted in Iran to increase the retention of anesthesia students in their workplace. Therefore, given the importance of this topic, the purpose of this study was to investigate the effect of a training program called retention on the clinical competence, self-efficacy, and occupational stress of undergraduate students of anesthesia at Ahvaz Jundishapur University of Medical Sciences (AJUMS), in their transition from the studenthood to the clinical workforce.

## Methods

This was a prospective, longitudinal, quasi-experimental study. The research population included all final-year undergraduate and newly graduated students of anesthesia studying at AJUMS, Ahvaz, Iran. Due to the limited number of students, the students were selected by census sampling method from among undergraduate students who met the inclusion criteria of the study. Randomization was only possible in the distribution of samples into the intervention and control groups. Final-year students who were about to enter the workplace or newly graduated students who had just entered the workplace were eligible to participate. The exclusion criteria were: unwillingness to participate in the research and absence in at least two sessions of the workshops held

in the intervention. After obtaining written informed consent, all students (60 people) entered the study and were divided into two groups (control group: n=30; intervention group: n=30) using a simple random method. The required data were checked in both groups through a pre-and post-test design. The intervention included a tailored educational-support program called "retention" which was developed with the assistance of a team of experts including 3 experienced professors from the Anesthesiology Department. The retention program was used for anesthesia students at the beginning of their field internship program (the last year of the bachelor's program). The content of the retention program included these steps:

1: With the cooperation of the instructors, frequent practice sessions were held using the OSCE test method in the practice hall. To this aim, according to a predetermined scenario, the students prepared a hypothetical patient (e.g., a patient with a fractured cervical vertebra), induced anesthesia, and emerge the patient from anesthesia in five OSCE stations. These stations and the OSCE checklist were developed by the faculty members of the Anesthesiology Department. Each station had an experienced evaluator who observed the student's performance and provided instant feedback and entered the evaluation scores into the checklist. The evaluators were selected from among senior students of Anesthesia Teaching who had at least 2 years of clinical experience and were also the clinical instructors of the students' field internship program. The research team coordinated and trained the evaluators to get familiar with immediate feedback while doing work.

Also, all stages of the interview were filmed at the same time. The video was reviewed by the research team, and specific feedback was provided to the students. These steps were taken at the end of the second and the third month in the same order (three times in total).

2: Supervision of the field internship by the research team: The research team established an online support network including the students and their instructors. The students could share the issues and problems they faced with the group. Counseling and support were provided to the students in person, by phone, or online.

3: Holding 6 supplementary workshops (retraining) including: basic and advanced cardiopulmonary resuscitation, principles of working with ventilators and interpretation of arterial blood gas samples, emergency medicine, job self-efficacy, and stress management. The educational content was selected based on the headings of the Ministry of Health and Medical Education for undergraduate students of Anesthesia, and the psychology-related content was selected and organized by expert psychology professors of the university. For the students to participate in the workshops, educational bonus scores were considered by the head of the department.

4: A group was formed in WhatsApp to share the contents of the workshops related to the course and to allow exchange of information between students and the research team. Also, the content of the following training courses was uploaded in the group so that they could exchange opinions and share their feedback: job self-efficacy, work stress reduction factors, types of ventilators, surgical and medical abbreviations and terms, common heart rhythms and how to use the cardiac defibrillation device, resuscitation drugs, articles and case reports related to anesthesia and surgery, and common cases that students encounter in the clinical environment.

5: The students who had already entered the work environment shared their work experiences and information about the work environment with other classmates in the group. These included: how to divide work shifts, the amount of salary and benefits of each work shift, the experiences of dealing with doctors, colleagues, or patients, etc. This was done so that the students who were about to enter or had recently entered the workplace could benefit from this information and experiences.

Throughout the study period, the relationship between the research team and the students was continuously maintained, and the students shared their problems and conflicts with their professors who provided them with the necessary feedback. Also, the students themselves shared their thoughts and opinions in the WhatsApp group and provided the necessary guidance to each other. Failure to participate in at least 2 training sessions or workshops was regarded as withdrawal from the study.

The control group received the routine training offered in the Faculty of Allied Medical Sciences. The routine is as follows: the undergraduate nurse anesthesia students complete all the courses approved to obtain a bachelor's degree in the university within four years. In the last year of study, the students practice and retrain their knowledge and skills in a hospital environment as an internship under the supervision of hospital officials, and upon obtaining the minimum passing scores, they will graduate and work in teaching hospitals as a human resource program.

At the beginning of the study and six months after the intervention, the questionnaires were provided to the participants by sending a link in the WhatsApp group, and data collection was done using the same questionnaires. After the data collection, the results were analyzed through statistical tests and were then compared and reviewed.

**Data collection tools**

1- Demographic questionnaire: This questionnaire included characteristics that could affect the variables of the research results. These variables included: gender, age, grade point average (GPA), workplace, and the level

of stability in the job (i.e., questions about the change of place of work and its reason during the study).

2- Competency Inventory for Registered Nurses (CIRN) [1]. CIRN was developed by Liu et al. in 2007, and has been used several times in various studies. It includes research, clinical care, leadership, interpersonal communication, legal and ethical practice, professional development, and teaching and learning. The questionnaire has 55 items that are scored based on a 5-point scale: completely incapable (score 0) to completely capable (score 4).

This inventory has been validated by Ghasemi and his colleagues in an Iranian population. They reported a content validity index of 0.94 for the whole tool and more than 0.83 for each item, indicating it as a reliable tool in the fields of human resource management, education, and clinical research [9].

3- The nursing stress scale (NSS): NSS was developed by Gray-Toft and Anderson in (1981) in order to measure the occupational stress of nurses. This questionnaire has 57 questions organized in 9 dimensions of mortality, conflict with doctors, insufficient emotional preparation, problems with colleagues, problems with supervisors, and high workload, ambiguity concerning treatment, patients and their families, and discrimination. The items are scored based on a Likert scale to measure occupational stress. In Aliai Khachik et al.'s research (2020), the content, form, and criterion validity of this questionnaire were evaluated and confirmed. Its reliability was also verified by obtaining a Cronbach's alpha coefficient of more than 0.7 [10].

4- Work Self-Efficacy Questionnaire: Work Self-Efficacy Questionnaire was developed by Riggs et al. in 1994. The questionnaire consists of 31 items organized in four subscales to measure individual self-efficacy beliefs (10 items), individual outcome expectations (8 items), collective efficacy beliefs (7 items), and collective outcome expectations (6 items). Riggs and Knight examined the psychometric properties of this questionnaire after its development. In a study including 30 operating room technologists, Rashidi et al. investigated the correlation between the leadership style of operating room supervisors and the job self-efficacy of operating room technologists. They calculated the reliability of this questionnaire using the test-retest method at two intervals 20 days apart, and its correlation coefficient was 0.74 [11].

**Data analysis**

In order to compare the demographic characteristics in the two groups, chi-square or Fisher's exact tests was used for nominal qualitative variables, and independent t-test was used for quantitative variables. Independent t-test was used to compare the intervention and control groups in terms of the mean score of occupational stress, clinical competence, and self-efficacy before and after the

intervention. Paired t-test was used to compare the mean score of occupational stress, clinical competence, and self-efficacy before and after the intervention in each group. The statistical software used for data analysis was SPSS version 22, and the level of significance in the tests was set at 0.05.

## *Results*

This study included 60 final-year and newly graduated students of anesthesia at AJUMS who were allocated into intervention and control groups. The findings related to the demographic characteristics of the participants showed that most of the subjects in both the intervention (73.7%) and control (73.1%) groups were women. All students were between 21 and 30 years of age. The GPA of most of the participants in both intervention and control groups was between 17 and 20. The workplace of the participants in the study, both in the intervention and control groups, was mostly in minimal surgery clinics. The results of the statistical tests showed that there is no statistically significant difference between the intervention and control groups in terms of demographic characteristics, which indicates the homogeneity of the participants in the two groups (Table 1).

**1- Results of clinical competence:**

As can be seen in (Table 2), the two groups did not have a statistically significant difference (P<0.05) in terms of the dimensions of clinical competence before the intervention. After the intervention, however, the dimensions of leadership, interpersonal relations, ethical practice, and research aptitude-critical thinking were significantly higher in the intervention group as opposed to the control group (P<0.05).

The results of the paired t-test showed that there was no significant difference in the control group in terms of the clinical competence before and after the intervention. However, in the intervention group, the mean scores of the clinical competence in the dimensions of teaching-coaching (P=0.043) and research aptitude-critical thinking (P=0.013) after the intervention were significantly higher than before the intervention, which means an increase in clinical competence in this group (Table 2).

**2- Results of self-efficacy:**

There was no significant difference between the two groups in terms of self-efficacy dimensions before the intervention (P<0.05). However, after the intervention, the dimensions of individual self-efficacy beliefs and the expectation of collective consequences were significantly higher in the intervention group compared with the control group (P<0.05). The results of the paired t-test showed that there was no significant difference in the control group before and after the intervention in terms

of work self-efficacy. However, except for the expectation of individual outcomes (P=0.241) and collective efficacy beliefs (P=0.688), the mean score obtained in the intervention group in other dimensions of work self-efficacy after the intervention were significantly higher than before the intervention, which means an increase in self-efficacy in this group. (p>0.05) (Table 3).

**Table 1- Frequency distribution of the participants' demographic variables in the intervention and control groups.**

| Variable | Variable levels | Intervention | Control | P value |
|---|---|---|---|---|
| Workplace | Not employed | 1(3.3) | 8(30.8) | 0.024 |
| | Surgery clinic | 20(66.7) | 15(57.7) | Fisher's exact test |
| | Non-teaching hospital | 6(20.0) | 2(7.7) | |
| | Teaching hospital | 3(10.0) | 1(3.8) | |
| GPA | 17-20 | 29(96.7) | 26(100) | 0.536 |
| | 14-17 | 1(3.3) | 0(0) | Fisher's exact test |
| Sex | Female | 22(73.3) | 19(73.1) | 0.983 |
| | Male | 8(26.7) | 7(26.9) | Chi-square test |
| Change of workplace | Yes | 10(40.0) | 16(61.5) | 0.124 |
| | No | 15(60.0) | 10(38.5) | Chi-square test |

**Table 2- Comparison of the numerical indices of the clinical competence dimensions of anesthesia students before and after the intervention in the intervention and control groups**

| Clinical competence dimensions | Time | Intervention group (*Mean SD*) | Control group (*Mean SD*) | P value |
|---|---|---|---|---|
| Clinical care | Before / | 26.75±5.43 | 26.38±5.68 | 0.99 |
| | After/ | 27.83±5.23 | 25.76±4.74 | 0.15 |
| | P value | 0.389 | 0.666 | |
| Leadership | Before / | 23.25±6.54 | 22.53±6.22 | 0.767 |
| | After/ | 26.25±5.21 | 22.65±5.6 | 0.023 |
| | P value | 0.059 | 0.941 | |
| Interpersonal relation | Before / | 22.25±4.64 | 22.38±4.36 | 0.662 |
| | After/ | 23.41±3.74 | 20.53±4.32 | 0.016 |
| | P value | 0.276 | 0.178 | |
| Legal/ethical practice | Before / | 23.37±5.30 | 23.34±5.12 | 0.781 |
| | After/ | 24.25±3.61 | 21.73±4.88 | 0.045 |
| | P value | 0.542 | 0.256 | |
| Professional development | Before / | 16.62±4.23 | 16.07±4.37 | 0.778 |
| | After/ | 17.58±1.90 | 16.46±3.85 | 0.205 |
| | P value | 0.286 | 0.733 | |
| Teaching-coaching | Before / | 15.0±4.88 | 14.5±4.83 | 0.874 |
| | After/ | 17.12±3.68 | 14.96±4.00 | 0.053 |
| | P value | 0.043 | 0.697 | |
| Research aptitude/ critical thinking | Before / | 19.79±6.78 | 19.57±6.38 | 0.989 |
| | After/ | 23.58±4.6 | 19.07±5.57 | 0.003 |
| | P value | 0.013 | 0.768 | |

**Table 3- Comparison of the numerical indices of work self-efficacy dimensions of the anesthesia students before and after the intervention in the intervention and control groups**

| Work self-efficacy dimensions | Time | Intervention group (*Mean SD*) | Control group (Mean SD) | P value |
|---|---|---|---|---|
| Individual self-efficacy beliefs | Before / After/ P value | 18.80±3.18 23.16±4.07 <0.001 | 18.69±3.12 25.76±4.74 0.341 | 0.99 0.15 |
| Expectation of individual consequences | Before / After/ P value | 14.72±2.73 16.12±4.46 0.241 | 14.96±2.53 15.03±3.01 0.923 | 0.996 0.432 |
| Collective efficacy beliefs | Before / After/ P value | 14.72±2.73 15.04±3.11 0.688 | 14.8±2.59 14.42±2.64 0.569 | 0.683 0.502 |

| | | | | |
|---|---|---|---|---|
| Expectation of | Before / After/ | 13.76±1.42 | 13.61±1.32 | 0.632 |
| collective consequences | P value | 15.68±2.7 | 14.19±1.52 | 0.022 |
| | | 0.009 | 0.177 | |

**3- Results of occupational stress:**

There was no statistically significant difference between the intervention and control groups in terms of the dimensions of occupational stress before the intervention (P<0.05). However, after the intervention, the scores of the dimensions of conflict with physicians, inadequate emotional preparation, high workload, and uncertainty concerning treatment were significantly lower in the intervention group compared with those in the control group (P<0.05).

The results of the paired t-test showed that before and after the intervention there was a significant difference in the control group only in terms of the dimensions of death and dying and uncertainty about treatment, with the mean scores obtained for these two dimensions after the intervention being significantly lower than those before the intervention. In the intervention group, on the other hand, the mean scores of occupational stress dimensions (P<0.05) except for the dimensions of conflicts with colleagues (P=0.525), conflicts with supervisors (P=0.879), patients and their families (P=0.102) and discrimination (P=0.46) were significantly lower after the intervention compared with before the intervention, which means stress reduction in this group (Table 4).

**Table 4-Comparison of numerical indices of occupational stress dimensions of anesthesia students before and after the intervention in the intervention and control groups.**

| Occupational stress dimensions | Time | Intervention group (*Mean SD*) | Control group (*Mean SD*) | P value |
|---|---|---|---|---|
| Death and dying | Before / After/ P value | 17.2±4.16 12.81±4.48 <0.001 | 17.73±3.87 14.76±3.78 0.01 | 0.733 0.093 |
| Conflicts with physicians | Before / After/ P value | 12.66±3.11 10.0±3.21 0.002 | 13.3±2.56 12.34±3.28 0.272 | 0.433 0.011 |
| Inadequate emotional preparation | Before / After/ P value | 6.11±1.71 3.74±1.25 <0.001 | 6.07±1.62 5.84±1.66 0.567 | 0.863 <0.001 |
| Conflicts with colleagues | Before / After/ P value | 11.33±3.89 10.77±3.64 0.525 | 12.42±3.36 11.03±3.77 0.129 | 0.222 0.799 |
| Conflicts with the supervisor | Before / After/ P value | 15.7±5.14 15.85±3.64 0.879 | 15.07±4.84 17.11±14.91 0.064 | 0.677 0.292 |
| High workload | Before / After/ P value | 23.44±5.59 19.11±4.97 0.001 | 24.57±4.41 22.3±6.07 0.097 | 0.29 0.041 |
| Uncertainty concerning treatment | Before / After/ P value | 23.85±3.75 19.14±4.83 <0.001 | 24.53±2.94 22.69±4.2 0.042 | 0.384 0.006 |
| Patients and their families | Before / After/ P value | 17.29±5.93 19.96±6.43 0.102 | 17.53±6.23 18.84±5.09 0.413 | 0.899 0.488 |
| Discrimination | Before / After/ P value | 7.44±2.25 6.96±3.34 0.46 | 7.69±2.14 7.0±2.52 0.362 | 0.829 0.964 |

**Overall results:**

According to (Table 5), the intervention and control groups were not significantly different in terms of the mean scores and standard deviation of occupational stress, clinical competence, and self-efficacy before the intervention. However, after the intervention, the two groups were significantly different in terms of clinical competence and work self-efficacy. As far as occupational stress is concerned, although there was no significant difference between the two groups after the intervention due to the reduction of stress in the control group, the results of the paired t-test in the intervention group showed that the difference between the pre-test and post-test scores was statistically significant (P=0.036). This means that scores of occupational stress in the intervention group after the intervention decreased

significantly compared to the control group. Therefore, implementation of the intervention (the retention program) in the intervention group was effective in terms

of clinical competence, self-efficacy, and occupational stress of the students after graduation (Table 5).

**Table 5- Comparison of numerical indices of occupational stress, clinical competence, and self-efficacy in anesthesia students in the intervention and control groups before and after the intervention.**

|  | Time | Intervention group (*Mean SD*) | Control group (*Mean SD*) | P value |
|---|---|---|---|---|
| Occupational stress | Before / After/ P value | 134.6±26.25 121.40±25.69 0.036 | 138.88±22.73 134.42±28.23 0.478 | 0.52 0.085 |
| Clinical competence | Before / After/ P value | 144.93±32.96 160.04±25.48 0.105 | 144.80±34.72 141.19±29.44 0.689 | 0.989 0.02 |
| Self-efficacy | Before / After/ P value | 62.06±4.89 69.30±6.88 <0.001 | 62.07±5.18 63.15±5.38 0.409 | 0.995 0.001 |

## Discussion

This study investigated the impact of an intervention, called retention program, on the clinical competence, self-efficacy, and occupational stress of undergraduate students of anesthesia at AJUMS, in their transition from a student to a clinical workforce. As mentioned in the results section, the intervention and control groups did not have statistically significant differences in terms of demographic characteristics, which indicated that the two groups were homogeneous (Table 1).

According to (Table 2), the post-test scores of both the intervention and control groups experienced improvement compared to the pre-test scores, but the improvement of scores in the intervention group was greater than that in the control group. However, in the control group, no statistical difference was observed in terms of clinical competence, occupational stress, and self-efficacy before and after the study. According to the literature, the first 3 months of starting a new job are the most difficult period in one's career that requires the most support. It is reported that during the transition process, 83.3% of newly graduated nurses experience stress due to the assigned tasks, which leads to negative personal, physical, and psychological consequences. A few examples of these negative consequences include frequent worry, anxiety, emotional instability, lethargy, changes in appetite, difficulty in falling asleep, interrupted sleep, and feelings of helplessness, despair, loneliness, and fatigue [2,12-17]

Comparing the mean post-test score of clinical competence obtained in the intervention group (160.04±25.48) with that in the control group (141.19±29.44), we could argue that the retention program led to a significant increase in the clinical competence of the students. (P=0.02) This increase which was observed in the dimensions of leadership, interpersonal relations, legal-ethical practice, and

research aptitude-critical thinking was significantly higher compared with the control group (P<0.05). Similar results were found in Tseng's study where after the implementation of the "survival" program in the intervention group, the students' clinical competence improved in terms of general clinical nursing skills, basic biomedical sciences, ethics, and overall practice evaluation, but in the dimensions of basic medical sciences and critical thinking, the students' clinical competence had the lowest scores [2]. However, in our study, the mean scores of clinical competence of students in the intervention group in the dimensions of teaching-coaching (P=0.043) and research aptitude-critical thinking (P=0.013) after the intervention were significantly higher than those before the intervention, which was due to the use of OSCE exercises. These results show the effect of a practical training program using creative thinking and problem solving methods on clinical competence. Roush et al. discussed the impact of the internship program in the internship period and concluded that this program had increased the acceptance rate of nursing graduates by 96%, which is in line with the increase in the clinical competence score obtained in our study [18].

Valizadeh et al. studied the effect of implementing achievement-based training on the clinical competence of nursing students studying at the seventh semester. They concluded that this training improved the behavioral and cognitive skills of clinical competence, which is in line with the results of our study [19]. Also, Sharif et al. obtained similar results in terms of the clinical competence of seventh and eighth semester students which rose to the level of mastery after the implementation of the training program. The clinical competence of anesthesia students can be enhanced by providing more opportunities in both theoretical courses and clinical practice during conventional education [21-22].

According to the results of (Table 3), occupational stress in the control group decreased after the intervention only in terms of "death and dying" and "uncertainty about treatment". However, in the intervention group, except for the dimensions of "conflicts with colleagues", "conflicts with supervisors", "patients and their families" and "discrimination", the mean scores of "death and dying", "conflict with physicians", "inadequate emotional preparation", "high workload", and "uncertainty about treatment" were significantly lower after the intervention compared with before the intervention, which means a reduction in occupational stress in this group (P>0.05) (Table 3). These findings are in line with the results of Tseng and Hwang's study where changes in occupational stress in newly graduated nurses had a downward trend over time. In their study, in the first 3 months of work, newly graduated nurses had the highest occupational stress, but counseling and continuous and regular support by the career coach after graduation, along with in-group support, helped to reduce the occupational stress of newly graduated nurses, which is in line with the results of our study [2]. Numerous studies have documented the relationship between occupational stress and the need for support among anesthesia students. Chipas et al., for instance, showed that anesthesia nursing students consider their stress higher than average, which is considered as their main concern [23]. Conner emphasized measuring occupational stress and creating support measures for anesthesia students in order to increase their self-efficacy, academic achievement, and retention in the work environment. Mathew and Padden investigated the implementation of a mindfulness program to improve self-efficacy, coping skills, and stress management of anesthesia nursing students. They concluded that the implementation of this program has a positive effect on the stress management of anesthesia students, which is in line with the results of our study [24-25].

With regard to self-efficacy in the control group, no statistically significant increase was observed. However, in the intervention group, in terms of individual self-efficacy beliefs and the expectation of collective consequences, the score improvement was significantly higher than that before the intervention, which means enhancement of self-efficacy in this group (Table 5). According to the documents, anesthesia nursing students do not have sufficient and acceptable clinical decision-making ability and self-efficacy, and it is recommended to devise programs to improve their understanding in this regard due to the vital nature of this profession. [20,26] Chen et al. investigated the relationship transition shock has with preventive support and clinical competence of newly graduated nurses. They found that a supportive approach such as establishing a support system and sharing personal experiences in crisis management can effectively prevent discouragement and build self-

confidence in newly graduated nursing students, which is in line with the results of our study. [27] In Tseng's study, students' self-efficacy decreased in the first few months of work but returned to the same level as before. The reason for this downward slope is believed to be the high expectations and requirements of the work environment. [2]

According to the results of (Table 1), 40% of the students in the intervention group, and 61.5% of the students in the control group changed jobs during the study. Based on the students' statements in the questionnaire, the reason for this was often high workload and low salary, lack of insurance coverage, and desire to work in bigger and more formal environments. However, the change of workplace in the intervention group was less often than that in the control group. Kim and Yeo studied the effect of pre-graduation characteristics and work environments on the transition shock of newly graduated nurses. They concluded that the work characteristics affecting transition shock include: type of employment, number of patients, type of hospital, work unit, monthly income, workplace environment, interpersonal relationships, and low self-efficacy. Also, inclusion of educational programs to increase self-efficacy was deemed necessary to improve the quality of care services. Kim et al. examined a program for improving the clinical readiness of newly graduated nursing students and evaluated its effect on the successful adaptation of these students in the hospital. According to their results, this program reduced the transition shock, improved readiness for nursing practice, job satisfaction, and intention to stay, which is in line with the results of our study [28]. Roush et al. studied the correlation of a nursing internship program with acceptance rate, retention rate in the hospital, and trust and satisfaction of the students. They found that 82% of the students started working in the same hospitals where their internship took place, and 96% passed the NCLEX-RN exam. They showed the benefits of using support programs for nurse retention and cost savings, which is in line with the results of our study [18].

## *Conclusion*

Our results showed the retention program improved the clinical competence, self-efficacy, and occupational stress of final year and newly graduated students of anesthesia at AJUMS. Since the work of a nurse anesthetist requires prompt decisions and actions that are directly related to the patient's life, inclusion of support and training programs before graduation or the first year after graduation, will provide valuable support and guidance for these students so that they could discern their weaknesses and strengths. Adoption of new educational approaches such as situation simulation, holding repeated practice sessions in the practice hall,

and staying in touch with the student after graduation and providing counseling can be other effective measures in this regard. In our study, we included all of the above in a coherent program called "retention". Therefore, it is suggested that educational and support programs using this approach be implemented for final year and newly graduated students in hospitals in order to reduce the rate of bedside errors, stress, and job abandonment, and to increase self-efficacy and clinical competence of newly graduated students.

**Limitations:**

One of our initial limitations of the present study was the reluctance of students to participate in this program due to their lack of previous knowledge and many work shifts. To overcome this problem, the students were first briefed on the benefits of the study and were assigned bonus scores for participation in the study. Also, WhatsApp groups were created for the students to share their experiences, exchange the content of workshops, and provide and receive feedback. These measures attracted students' participation so much so that during the study, students were willing to share their experiences and talk about issues and conflicts at work with their instructors.

**Suggestions:**

Future studies are recommended to include a larger group of students of other clinical fields.

### References

[1] Tolyat M, Taherirad M, Pirannezhad R. The challenges of clinical education in operating room and anesthesia Students of Birjand University of Medical1-1 Sciences. DSME 2020; 7(1):52-60

[2] Tseng MY, Hwang SL. 'SURVIVAL' intervention program effects on student nurses' transition to staff nurses: A quasi-experimental study. Nurse Educ Pract. 2021; 56:103184

[3] Abedi HA, Heidari A, Salsali M. New graduate nurses' experiences of their professional readiness during transition to professional roles. Iran J Med Educ. 200;4(2):69-78.

[4] Kim EY, Yeo JH. Effects of pre-graduation characteristics and working environments on transition shock of newly graduated nurses: A longitudinal study. Nurse Educ Today. 2019; 78:32-6.

[5] Hoffart N, Waddell A, Young MB. A model of new nurse transition. J PROF NURS. 2011;27(6):334-43.

[6] Bahrami Z, Norouzi S, Ramezanibadr F, Norouzi A. Design, Implementation and Evaluation of an Operational Program to Improve the Quality of Basic Clinical Skills in Nursing Students in Zanjan University of Medical Sciences in 2017. J Med Edu Dev. 2019;12(34):34-40.

[7] Liaw SY, Koh Y, Dawood R, Kowitlawakul Y, Zhou W, Lau ST. Easing student transition to graduate nurse: a simulated professional learning environment (SIMPLE) for final year student nurses. Nurse Educ Today. 2014;34(3):349-55.

[8] Chen F, Liu Y, Wang X, Dong H. Transition shock, preceptor support and nursing competency among newly graduated registered nurses: A cross-sectional study. Nurse Educ Today. 2021; 102:104891.

[9] Jeon Y, Ritmala-Castrén M, Meretoja R, Vahlberg T, Leino-Kilpi H. Anaesthesia nursing competence: Self-assessment of nursing students. Nurse Educ Today. 2020; 94:104575.

[10] Imani B, Zandyeh M, Mahdiyoun A. The effect of emotional intelligence on the clinical competency. J Nurs Educ. 2019;7(3):63-9.

[11] Olyaiekhachic R, Bozorgnejad M, Haghani SH, Khayeri F, Seyedfatemi N. Evaluating the Effect of Positive Self-Talk on Job Stress among Nurses Working in the Emergency Wards. Iran J Nurs. 2020; 33(127):89-102

[12] Ramezanpoor E, Amiri F, Rashidi N. Relationship between leadership style of operating room head nurses and Job self-efficacy of operating room technologists. J Health Promot Manag. 2020;9(1):51-8.

[13] Imani B, Imani G, Karampourian A. Correlation between spiritual intelligence and clinical competency in students who are children of war victims. Iranian J Psychiatr. 2021;16(3):329.

[14] Ramezanpoor E, Amiri F, Rashidi N. Relationship between leadership style of operating room head nurses and Job self-efficacy of operating room technologists. J Health Promot Manag. 2020;9(1):51-8.

[15] Zhang Y, Steege LM, Pavek KU, Brown RL, Zhang Y. Identifying patterns of occupational stress trajectories among newly graduated nurses: A longitudinal study. Int J Nurs Stud. 2019; 99:103332.

[16] Woo MW, Newman SA. The experience of transition from nursing students to newly graduated registered nurses in Singapore. Int J Nurs Sci. 2020;7(1):81-90.

[17] Duchscher JE. Transition shock: The initial stage of role adaptation for newly graduated registered nurses. J Adv Nurs. 2009; 65(5):1103-13.

[18] Duchscher JE. Transition shock: The initial stage of role adaptation for newly graduated registered nurses. J Adv Nurs. 2009;65(5):1103-13.

[19] Valizadeh S, Mohammadpour Y, Parvan K, Lakdizaji S. The Effect of Outcome-Based Education on Nursing Students' Clinical Competency. Iran J Med Educ. 2009;9(2).

[20] Sharif MR, Mirbagher Ajorpaz N, Arandian N. Effects of mastery learning model on clinical competencies in the operating room students. J Community Health. 2017;10(3):11-8.

[21] Jeon Y, Ritmala-Castrén M, Meretoja R, Vahlberg T, Leino-Kilpi H. Anaesthesia nursing competence: Self-assessment of nursing students. Nurse Educ Today. 2020; 94:104575.

[22] Willman A, Bjuresäter K, Nilsson J. Newly graduated registered nurses' self-assessed clinical competence and their need for further training. Nurs Open. 2020;7(3):720-30.

[23] Chipas A, Cordrey D, Floyd D, Grubbs L, Miller S, Tyre B. Stress: perceptions, manifestations, and coping mechanisms of student registered nurse anesthetists. AANA journal. 2012;80(4).

[24] Conner M. Self-efficacy, stress, and social support in retention of student registered nurse anesthetists. AANA journal. 2015;83(2).

[25] Mathew J, Padden A. Institution of a mindfulness program to improve nurse anesthesia students' self-efficacy, coping skills, and stress management (Doctoral dissertation, Rutgers University-School of Nursing-RBHS).

[26] Albooghobeish M, Saidkhani V, Angali KA, Farzaneh M. Clinical Decision-Making and Self-efficacy Skills in Anesthesiology Nursing Students: A Cross-Sectional Study. Shiraz E Med J. 2023; 24(4).

[27] Chen F, Liu Y, Wang X, Dong H. Transition shock, preceptor support and nursing competency among newly graduated registered nurses: A cross-sectional study. Nurse Educ Today. 2021; 102:104891.

[28] Kim EA, Lee JS, Bong YS, Jang EH, Lim YH, Kim JA, Song N. Nursing practice readiness improvement program tailored for newly graduated registered nurses: A quasi-experimental study. Nurse Educ Today. 2024; 133:106077.