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Comparison of professional competency and anxiety of nursing students trained based on two internship models: a comparative study

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Abstract

Background Improving the professional competency of nursing students during the internship is critical. This study aimed to compare the professional competency and anxiety of nursing students trained based on two internship models.

Methods This is a two-group posttest-only quasi-experimental design study. One hundred nursing students who passed internship models A (a previous internship model) and B (an intervention with more educator support and a more planned and programmed process) were randomly enrolled in this study. Internship model groups A and B were conducted for the students in semesters 7 and 8. The outcomes assessed in both groups were "The Competency Inventory for Registered Nurses" and Spielberger "State-Trait Anxiety Inventory". T-test and MANOVA were used to analyze the data.

Results The mean scores of competency were 134.56 (SD = 43.23) and 160.19 (SD = 35.81) for the nursing students in the internship model groups A and B, respectively. The mean scores of nursing students' anxiety were 92.14 (SD = 15.36) and 80.44 (SD = 18.16) in the internship model groups A and B, respectively. MANOVA test showed a significant difference between the groups regarding professional competency (F = 10.34, p = 0.002) and anxiety (F = 11.31, p = 0.001).

Conclusions The internship model group B could improve the professional competency of nursing students to a great extent and they experienced mild anxiety; it is suggested that this intervention should be done for nursing students. Conducting more studies to evaluate the effect of this model on the nursing students' competency and anxiety after graduation and as a novice nurse is suggested.

Keywords Anxiety, Clinical competence, Education, Internship, Students, Nursing

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Introduction

Increasing clinical setting complexity necessitates further attention to nursing students' competency [1]. The 7th and 8th semesters, when students spend more time in clinical environments, are one of the best times for improving nursing students' competency. The use of clinical models, including internship, may be useful at this time. In the internship period, nursing students are directly supervised by the Nursing Unit Managers (NUMs) and clinical nurses and indirectly by the academic professor as a supervisor [2].

Internship, as an education model, was beneficial for the students, teachers, and patients. It not only improved health preservation but also increased the nursing students' skills [3]. In the internship model, efforts were made to achieve clinical competency [2]. It improved nursing students' knowledge, skills, and attitude [4]. It allows the knowledge acquired during the entire course to be (re) evaluated so that the professional competence is improved. Moreover, the teaching-learning methods are built according to critical pedagogy [5]. The students practiced self-management and tried to control the situations and stress [2]. It was mentioned that it improved professional identity and self-efficacy [6]. This model of education led to nursing students' interaction with staff nurses and invisible evaluation [7]. It also reduced the gap between theory and practice [8] and increased nursing students' process-based performance [9]. Moreover, it developed coping strategies for workplace adversities [6]. A study on the internship of community health nursing showed that service-based learning was effective in improving nursing students' health education competencies and its subscales including skill, knowledge, community presence, attitude, and professional preparation [10].

Although this model of education in clinical setting has some advantages, it has some challenges such as lack of support and difficult planning [7]. Researchers reported that anxiety and low self-confidence in clinical competence settings were the challenges in nursing students' internship period [11]. Lack of self-confidence caused anxiety and fear [11]. During this period, students showed anxiety with symptoms such as nervousness, fear, frequent urination, hand and foot tremors, panic, somatic pain, palpitation, facial flushing, sleep disturbance, etc. [11].

Considering the effects of the internship program in other countries and Iran, the researchers evaluated the difference between the existing program in Shiraz (nursing students' internship model A) and other parts of the world. The researchers also raised the question of how to improve the nursing students' professional competency during the internship and how to reduce their anxiety. In the comparison of the running program (nursing student's internship model A) with the other countries, there were differences. The first one was the duration of the program that was about 12 weeks. Secondly, the students were not full-time employees in the clinical environment, and they left the ward at 1:00 PM. Next, they were only oriented to general information about the program and did not receive basic nursing trainings. In addition, nursing students were not paid during the course and insured.

Literature review showed that in the nursing students' internships, exploitation and lack of incentive were the barriers to success in this program [12]. On the other hand, support, self-efficacy, internship structure, and setting were the factors that affected the students' adjustment [13]. Work experience, environment, and critical thinking were the factors effective in development of nursing competence [14]. Moreover, a supportive internship system using motivation strategies as a helpful method improved nursing students' performance [15]. In addition, researchers suggested that all the actors involved in nursing students' internships should facilitate the efficacy of teaching and learning [16]. Furthermore, another study recommended that stakeholders should use increased educational preparation for the internship stage to evolve healthcare market supply and need [17].

In order to solve those limitations and promote the program based on the above-mentioned suggestions at the global level, in addition to solving the above points, changes were made in the model A and it was named "nursing student's internship model B". For this purpose, director of the Nursing School of Shiraz University of Medical Sciences, their academic teachers, the nursing director of Nemazee hospital, and the director of the provincial nursing office support were considered. More detailed planning was considered to implement and manage the internship model. During the formative evaluation of the model, several meetings between Shiraz Nursing School and the clinical environment were held to identify and resolve deficiencies. Therefore, to improve the evidence-based practice, this study aimed to compare the professional competency and anxiety of nursing students trained based on the two internship models. The following hypotheses were posed:

1) Nursing student's internship model B improves the nursing students' professional competency compared to model A.
2) Nursing student's internship model B reduces the nursing students' anxiety compared to model A.

Methods

Study design

This is a comparative study with nonequivalent control group posttest-only quasi-experimental design. In this interventional study with no concurrent controls, a

new nursing student's internship model (B) is proposed. It helps the researchers to select group (B) to be trained using this model and then compare their outcomes to that of a previous nursing student's internship model group (A). In fact, internship model group (A) was considered as a control group. It should be noted that the students were in two different groups and were selected for each group at two consecutive semesters.

Setting
The setting of this study was Nursing and Midwifery School of Shiraz University of Medical Sciences (SUMS). The intervention of nursing student's internship model group A was carried out routinely from September 2022 to June 2023 and its data were collected in June 2023. The intervention in the nursing student's internship model group B started from September 2023 and data collection was done in June and July 2024.

Participants
The undergraduate nursing students who were in the seventh and eighth semesters, had passed internship model (A/B) for at least one semester (model A was applied in one semester and model B in the other semester), and were willing to participate were enrolled in this study. Exclusion criteria included a known case of psychiatric disorder confirmed by the doctor according to the student report, incomplete completion of the questionnaires, guest students, and those transferred from another university since the 6th semester because these students might be different from those in the university under study in terms of experience and professional competency. One hundred nursing students participated in this study.

Sampling
Fifty students were randomly selected among the subjects who passed the internship model (A) Moreover, students who participated in the internship model B were randomly selected to group (B) In order to conduct random sampling for each group, we obtained the list of students in Nursing and Midwifery School of SUMS; based on a random number table, 50 students were selected for each group. For sampling, an individual from outside the team participated.

Sample size
Given that there was no study for comparison on the two groups to evaluate the professional competency and anxiety of nursing students during their internship, the sample size was determined using the study of Liou et al.'s study [18], which compared the performance competence pre-graduate nursing students and hospital nurses. Based on $\alpha = 0.02$, $\beta = 0.2$, the proportion of subjects that

were in the internship model group A=0.5, proportion of subjects that were in the internship model group B=0.5, $\mu_2 - \mu_1$ of competency=25.54, SD=41.35 in Liou et al.'s study and using "Sample Size Calculators for designing clinical research" (https://sample-size.net/sample-size-means/) to compare the mean of a continuous measurement in two samples, the sample size was determined 43 nursing students in each group. Then, considering 15% dropout, it was determined as 50 subjects for each group.

Outcomes and measurements
The outcomes assessed in both groups were professional competency and anxiety. In the demographic form, the gender and age of the nursing students were collected. The professional competency of nursing students was measured using the self-report questionnaire named "The Competency Inventory for Registered Nurses". It was developed in China by Liu et al. in 2007. Firstly, the inventory had 58 items [19]. In exploratory factor analysis, three items were deleted and the inventory with 55 items was approved. This inventory consists of the dimensions of clinical care, leadership, interpersonal relation, legal/ethical practice, professional development, teaching/coaching, and critical thinking/research aptitude. Higher scores indicate a higher nursing professional competency. Each item of this inventory was scored using a 5-point Likert scale ranging from score zero (not competent at all) to four (very competent). The total score is 0 to 220 [1]. A higher score indicates greater competence of the nurse [1, 19]. The competence level was placed in three levels of high competence (165–220), medium (110–165) and low (<110). The reliability of the professional competency inventory was assessed by Liu et al. in 2007, and it was confirmed using Cronbach's alpha of 0.89 and 0.79–0.86 for the dimensions. The content validity of this checklist was confirmed by Liu et al. and reported as 0.85 [1, 19]. Ghasemi et al. assessed the psychometrics of this inventory in the Persian language and the reliability of this checklist using Cronbach's alpha was 0.90; also, its dimensions were 0.71–0.90 [20]. As Table 1 shows, in this study, reliability was estimated 0.98 for the professional competency and 0.93–0.95 for its dimensions using Cronbach's alpha.

The anxiety of nursing students was measured using Spielberger State-Trait Anxiety Inventory (STAI). It was developed by psychologists Charles Spielberger. This inventory has 40 items. Twenty items indicate state anxiety and twenty show trait anxiety. Each item was scored on a four-point Likert scale (not at all =1, somewhat=2, moderately so =3, and very much so =4). For the total inventory, the minimum score was 40 and maximum score was 160. A lower score means less anxiety and a higher score indicates more anxiety [21]. The convergent validity and internal consistency of the Persian version of

Table 1 Comparison of the nursing students' professional competency and its dimensions between internship model groups a and B

	Reliability	Internship model group A	Internship model group B	Between groups Using independents t-test, *p*-value	Between groups effect using MANOVA Test, *p*-value	η2†
	Cronbach's alpha	Mean (SD)	Mean (SD)			
Professional Competency	0.98	134.56 (43.23)	161.00 (36.69)	t=-3.21, *p* = 0.002	F = 10.34, *p* = 0.002	0.10
Dimensions						
Clinical care	0.95	22.44 (7.70)	28.28 (7.85)	t=-3.57, *p* = 0.001	F = 13.51, *p* < 0.001	0.12
Leadership	0.94	21.26 (7.27)	25.76 (6.92)	t=-3.01, *p* = 0.003	F = 9.59, *p* = 0.003	0.09
Interpersonal relation	0.95	18.98 (7.07)	23.02 (6.79)	t=-2.77, *p* = 0.007	F = 8.11, *p* = 0.005	0.07
Legal/ ethical practice	0.93	20.70 (7.33)	24.65 (5.24)	t=-2.68, *p* = 0.008	F = 9.07, *p* = 0.003	0.08
Professional development	0.94	15.60 (5.55)	18.26 (4.04)	t=-2.55, *p* = 0.01	F = 7.09, *p* = 0.009	0.07
Teaching/coaching	0.93	15.10 (5.49)	17.73 (4.38)	t=-2.78, *p* = 0.006	F = 6.68, *p* = 0.01	0.06
Critical thinking/research aptitude	0.95	20.48 (7.24)	23.28 (5.520)	t=-2.10, *p* = 0.03	F = 4.48, *p* = 0.03	0.04

† η2, Partial Eta Square

Table 2 The normal levels of anxiety based on spielberger state-trait anxiety inventory

	No, lowest	Mild	Moderate	High
State anxiety	20–30	31–42	43–53	≥54
Trait anxiety	20–34	35–45	46–56	≥57

State-Trait Anxiety Inventory were approved [22]. The normal level of anxiety is shown in Table 2. In this study, Cronbach's alpha for total anxiety, state, and trait anxiety was 0.94, 0.91, and 0.89, respectively.

Data collection procedure

Data for this study were collected using the above-mentioned questionnaires. The nursing students of each group were invited to a class in the hospital and clinical setting, the questionnaires were distributed among them, and the students completed them in the presence of the researcher.

Interventions

Internship model A

As Table 3 shows, in internship model A, at the beginning of semester seven, an introductory meeting was held for the students about the new program. The students in semesters seven and eight were trained in emergency, recovery, operation room, burn, hemodialysis, pediatric departments, neonatal intensive care unit (NICU), intensive care unit (ICU), and Coronary care unit (CCU) by their academic professors. Then, the students passed their internship period after each department/unit. It was in 12 weeks. The nursing students were rotated in critical care, pediatric and medical-surgical units. This period was conducted in the morning shift.

During the internship period, the students were supervised by the ward NUMs or head nurse, and the academic professors randomly followed up and visited the students. The professor talked to the students more about the physical and communication challenges in clinical environment and tried to solve them. In addition, she asked the NUMs and nurses to play a role in the education of students according to their training department and course. The evaluation of students was done by NUMs using evaluation checklists. In addition, if the students had a problem, they informed the head of the department in the faculty.

Internship model B

As Table 3 shows, in the internship model B, at the beginning of semester seven, an introductory meeting was held for the students about the new program. Then, the training classes were held for them, including "how to do drug administration and its nursing care", "how to handover patients between two shifts", "how to write the nurse's note", "how to perform cardiopulmonary resuscitation", and "how to work with the DC shock machine". Moreover, an electronic system was used to register the students' entry and exit, and the students worked as staff nurses in the department. They were present in a clinical department for a longer period compared to group A. All students were covered by an insurance company for professional services insurance. The following people played an active role in the planning and management of the internship model B:

1) Manager, vice-chancellors, and the directors of the nursing groups (medical/surgical, critical care, pediatric and community health nursing) in the school of Nursing and Midwifery of SUMS.
2) Fars provincial nursing office manager and her vice-chancellors.
3) Nemazee nurse manager and her educational and clinical supervisors.
4) Vice-chancellors of SUMS.

Table 3 The comparison of contents of internship models a and B

	Internship model A	Internship model B
Program introduction	- Introducing meeting regarding new program	- Introducing meeting regarding new program - Fundamental and clinical training classes
Students' registration	- Manual registration of students' attendance - Lack of insurance for students	- Electronic registration of students' attendance - Student insurance
Duration and clinical environment teaching	- Passed internship period for 12 weeks in some medical-surgical, pediatrics and intensive care units	- Passed internship period for one year in several medical-surgical, pediatrics, and intensive care units, and community based health service.
Course time	- Course was in morning shift	- Course was in morning, evening and night shifts
Visit by college professors	- A random visit by the professor to solve physical and communication problems	- The planned visits of the professor in teaching clinical contents, and supporting students and integrative interaction with the students, personnel and clinical environment and solving problems and challenges
Meeting among college, hospital authorities, and Fars provincial nursing office	Holding some meetings between Shiraz clinical medical-surgical and pediatric directors with Nemazee nurse manager and her educational and clinical supervisors if necessary	Holding numerous meetings among: - Shiraz nursing school manager, vice-chancellors, directors of nursing groups and professors managers - Fars provincial nursing office manager and her vice-chancellors - Vice-chancellors of SUMS - Nemazee nurse manager and her educational and clinical supervisors
Counseling sessions with the students	Holding a meeting with the student representative if necessary	Holding numerous counseling sessions with nursing students for formative and summative evaluation
Payment	- Without paying students	- Paying monthly salaries to students
Evaluation	- The evaluation by the NUMs	- The evaluation by the academic professors and NUMs, accuracy

Firstly, the students were trained in the full-time presence of the academic professors in emergency, burn, hemodialysis and pediatric departments, and operating and recovery rooms. After that, in the internship period, the students spent morning, evening, and night shifts in emergency, pediatric, hemodialysis, medical, and surgical departments. In the eighth academic semester, this program was applied for "maternal and newborn diseases" clinical course, emergency, and "advanced children nursing" departments. During the internship period, the students attended these clinical courses without the direct presence of an academic professor and under the direct supervision of NUMs. As to ICU and CCU, the students spent 12 days with their academic professor and then attended their internship period for 4 weeks. In addition, students spent their morning shifts in the community-based health services department.

During this period, for the first 2 weeks of the shifts, one of the supervising professors, one of the experienced professors, and an expert in diseases and care processes referred to the students' department and taught the necessary contents based on the patient or patients assigned to the students every day. In the third and fourth weeks, the supervising professors visited the departments 3 times a week and from the 5th week of shifts, two times a week. In these supervisory sessions, in addition to teaching the characteristics of each disease, the patient's drugs and their specific nursing care, general nursing care such as the principles of dressing, urinary catheterization, tracheostomy suction, prescribing blood products and their complications, and nursing care by the professors, the students were also taught to prescribe high-risk drugs such as KCL, etc.

To consolidate learning, we asked the students to complete assignments related to these trainings and sent them to the professors on social media. Moreover, the supervising professors provided a report on the status and progress of each student on social media and in face-to-face meetings to other professors and those in charge of clinical education that were held monthly in order to facilitate coordination in the education of students. Additionally, the specific patients and their nursing care as "case study" were identified and informed to the head nurse of the clinical education of this course, so that these case studies could be analyzed and presented in the form of clinical and medical grand rounds and workshops. The evaluation of students was done by the academic professors and NUMs using evaluation designed form.

It should be noted that at the end of this study, the contents of training classes were provided for internship model A in the form of MP3 and MP4 files.

Ethical considerations

Research Ethics Committees of Schools of Nursing and Midwifery, Management and Medical Information Science in Shiraz University of Medical Sciences approved this study (IR.SUMS.NUMIMG.REC.1402.027, approval date: 2023-05-28). Participation/non-participation of this study was voluntary. The permission to apply "The Competency Inventory for Registered Nurses" was obtained from Ming Liu by the fourth author of our study. The questionnaires were anonymous. Our study was conducted in accordance with the Declaration of Helsinki. The study purpose, procedure, probable complications

and the ways of compensation and the person responsible for these possible complications in this study were explained in a consent form. The consent to participate was obtained from the nursing students. All of the nursing students signed the consent form. We confirmed that this consent was informed. The results of this study were reported to Nursing and Midwifery School of SUMS.

Data analysis

Data analysis of this study was conducted using SPSS version 24. Mean, standard deviation, frequency, and percentage were reported. The Independent Samples t-test was used to compare the means of two independent groups in order to determine whether there is statistical evidence that the associated population means are significantly different. Moreover, multivariate analysis of variance (MANOVA) was used for comparing multivariate sample means. As a multivariate procedure, it is used when there are two or more dependent variables, and is often followed by significance tests involving individual dependent variables separately. In this study, to assess how large the effect of the intervention was on the professional competency and anxiety of nursing students, we measured partial eta squared (η2). According to Cohen 1988, an η2 equal to 0.00-0.01, 0.01–0.06, 0.06–0.14, and 0.14-1 means negligible, small, medium, and large, respectively [23]. $p < 0.05$ was considered as significant.

Results

50% of the nursing students in both groups were female. The mean age of the students was 23.48 (SD=1.77) and 23.64 (SD=2.70) in the internship model groups A and B, respectively. No significant difference was observed between the groups regarding gender (χ^2=1.00, p=0.00)

and age (t= -0.34, p=0.72) of the students who participated in this study.

As Table 1; Fig. 1 show, the mean scores of professional competency were 134.56 (SD=43.23) and 160.19 (SD=35.81) for the internship model groups A and B, respectively. Based on these mean scores, nursing students in the internship model groups A and B reported a medium level of professional competency. As displayed in Table 1, independent sample t-test and MANOVA test showed a significant difference between the groups regarding professional competency and its dimensions (p<0.05). Based on the professional competency η2 that was 0.1, a medium effect size was reported. The highest and lowest η2 among the dimensions of professional competency were related to clinical care and critical thinking/research aptitude, respectively (Table 1). Moreover, as Table 1 shows, all the dimensions of professional competency were significantly higher in the internship model group B compared to group A (p<0.05). Moreover, based on the η2 in Table 1, all professional competency dimensions had medium η2 except for critical thinking/research aptitude that was low.

As Table 4; Fig. 1 show, the mean scores of nursing students' total anxiety were 92.14 (SD=15.36) and 80.44 (SD=18.16) in the internship model groups A and B, respectively. Independent sample t-test and MANOVA test showed a significant difference between the groups regarding total anxiety (p=0.001). Based on the anxiety η2 that was 0.11, a medium effect size was indicated (Table 4).

Moreover, as shown in Table 4, the mean scores of state anxiety were 47.43 (SD=7.27) and 41.32 (SD=8.62) in the internship model groups A and B, respectively. Based on these mean scores, the nursing students experienced moderate and mild state anxiety in the internship models
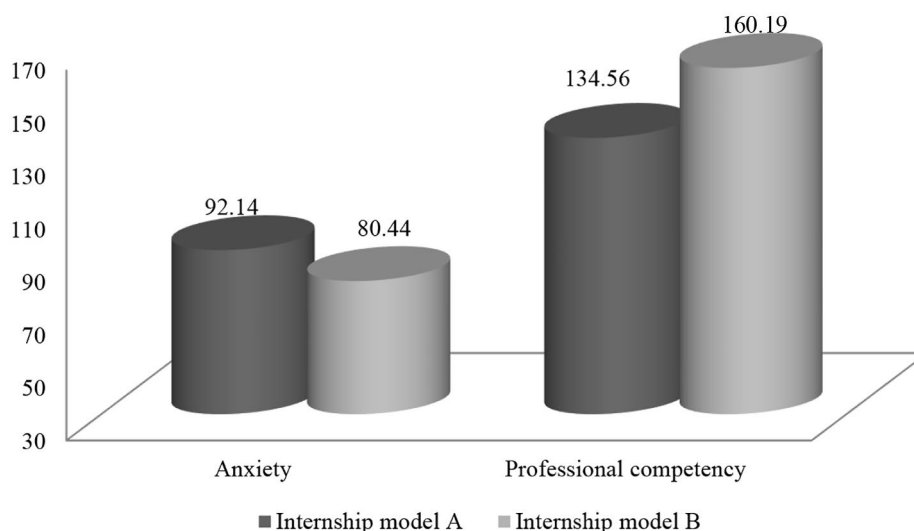
Fig. 1 Comparison of the nursing students' anxiety and professional competency between internship model groups A and B

Table 4 Comparison of the nursing students' total anxiety and its dimensions between internship model groups a and B

	Internship model group A	Internship model group B	Between groups Using independents t-test, *p*-value	Between groups effect using MANOVA Test, *p*-value	η2†
	Mean (SD)	Mean (SD)			
Anxiety	92.14 (15.36)	80.44 (18.16)	t = 3.36, *p* = 0.001	F = 11.31, *p* = 0.001	0.11
Dimensions					
State anxiety	47.43 (7.27)	41.32 (8.62)	t = 3.64, *p* < 0.001	F = 13.30, *p* < 0.001	0.12
Trait anxiety	44.80 (9.44)	39.11 (10.92)	t = 3.16, *p* = 0.002	F = 7.24, *p* = 0.008	0.07

groups A and B, respectively. Independent sample t-test and MANOVA test indicated a significant difference between the groups regarding the mean scores of state anxiety ($p < 0.001$). Based on the state anxiety η2 that was 0.12, a medium effect size was found.

In addition, as Table 4 shows, the mean scores of trait anxiety were 44.80 (SD = 9.44) and 39.11 (SD = 10.92) in the internship model groups A and B, respectively. Based on these mean scores, both groups of nursing students experienced mild trait anxiety. However, independent sample t-test and MANOVA test showed that the mean score of trait anxiety was significantly lower in the internship model B compared to model A ($p < 0.05$). Based on the trait anxiety η2 that was 0.07, a medium effect size was indicated.

Discussion

This study aimed to compare the professional competency and anxiety of nursing students trained based on the two internship models. The nursing students in the internship model group B significantly reported higher mean scores of professional competency and experienced lower mean scores of anxiety compared to the internship model group A.

Our findings revealed that nursing students in the internship model groups A and B reported medium levels of professional competency. A study reported that internship program helped the students achieve clinical competency, and increased academic and professional skills [2]. Our results indicated that the internship model group B significantly reported higher mean scores of professional competence compared to group A. In a study, it was reported that clinical supervision model in internship nursing students improved the nursing process-based performance [9]. In the internship model group B, the students had the support of the professor. Their needs were considered by managers, supervisors, professors, etc. The detailed planning of educational and clinical managers reduced the gap between theory and practice and had a positive effect on the internship students. In addition, interactions between professors and students; professors and supervisors, nurses, and patients; students and educational managers; and educational and clinical managers were extensively carried out. The challenges of the students were identified and solved by the

team quickly. Possibly, above-mentioned reasons led to improvement of professional competency in the internship group B compared to the internship model A.

Our study showed nursing students in the internship model group B reported higher clinical care and professional development competency compared to the group A. In addition, the group B had higher mean scores of teaching and coaching compared to the group A. Moreover, the highest effect size was related to clinical care competency. A qualitative study reported that the internship program in nursing students improved their clinical skills and "professional self-efficacy". In addition, these nursing students had professional identity development. They indicated that internship program led to "accepting professional roles" [6]. In a study on the attitude of nursing students "community-based training and internship", it was reported that nursing students had a teaching role and provided some of the clients and patients with information regarding lifestyle, mental health, hygiene, etc. [3]. It seems that in the internship model group B, the full presence of the nursing students in each work shift provided the opportunity to deliver clinical care and educate the patient and colleagues. In addition, because students are still studying, when they encounter new topics, they try to learn them by reading reliable books and Internet sources, asking their peers or supervisors, and providing the nursing staff and the healthcare team with this information. Since there was a lot of emphasis on students' clinical care in the internship model group B, their supervisors evaluated and taught the skills daily, and the nurses emphasized the students' education; there was a possibility that this group had better mean scores of clinical care and professional development competency as compared to group A.

This study indicated that interpersonal relations and leadership competency were higher in the internship model group B compared to group A. Researchers believed that in the learning process, interpersonal relationships linked the patients, students, and supervisors to each other [24]. They suggested that we should respect each other and provide supportive interaction, leading to improvement in learning outcomes [24]. In clinical setting, interpersonal relationship is crucial for the nurses because it improves the nursing students' learning and their outcomes [25]. It seems that better and more

frequent interpersonal relations between supervisors, students, and nurses in the internship model group B compared to the group A further improved the nursing students' competency. In the internship model group B, nursing students worked as staff nurses. They became familiar with facts, documents, etc. Therefore, as they probably knew each other's strengths and weaknesses and the setting atmosphere and climate, they cooperated better, conducted teamwork, and communicated with other health team members, compared to group A.

Our study showed nursing students in the internship model group B reported higher critical thinking/research aptitude competency compared to group A. However, the smallest difference between the two groups was in this variable. A qualitative study showed the "lack of scientific research training" as a barrier to nursing internship [26]. A study indicated that critical thinking subscale of performance competence in nursing students' internship model was in the lowest level [18]. Therefore, using knowledge and reflecting on it to solve the clinical problems in nursing students needs more attention in both groups.

Our findings showed legal/ethical practice competency had a higher mean score in the internship model group B, compared to group A. Intern nursing students' moral sensitivity was associated to "ethical decision-making ability" [27]. It was mentioned that ethical issues would happen in clinical setting among healthcare workers, supervisors, teachers, and patients [28]. As in the internship model group B, nursing students worked as staff nurses for a long time in a ward/department, it seems that they paid more attention to the security of the patients' information. Moreover, because they worked as staff nurses, they might have more respect to the patients' privacy, be more familiar to advocating the rights of the patients, and take more responsibility for their performance compared to group A.

The nursing students experienced moderate and mild state anxiety in the internship models groups A and B, respectively. Moreover, both groups experienced mild trait anxiety. This study indicated that state-trait anxiety was lower in the internship model group B compared to group A. In the same line with the present study, the results of a study in China showed that the anxiety level of nursing students after experiencing the internship program was moderate. Because nursing students are still in the transition phase during internship, their psychological defense mechanisms seem to be incomplete [29], resulting in experiencing mild to moderate anxiety by them. A study showed that painful experiences during the internship period, feedback and suggestions of trainers, and hard work in the evening and night shifts were the factors that caused anxiety during the internship period [11]. Of course, researchers believe that moderate anxiety has a protective role and could lead to the improvement of individual ability in response to environmental stimuli [11]. In group B, holding preparatory workshops for the students before the start of the internship period, close communication between students and academic supervisors, as well as frequent communication and meetings between the hospital nurse managers and educational supervisors with educational and clinical vice-chancellors and academic supervisors probably led to experiencing lower anxiety by nursing students.

This study had some limitations. Since there was no exact control group in this study, it was not possible to compare nursing students who had not experienced these two interventional models and had passed the 7th and 8th semester traditionally, in terms of professional competence and anxiety. Moreover, without a control group, it is impossible to exactly conclude which outcomes were the result of the internship model groups A/B rather than the other variables. Therefore, it is suggested that these interventions should be compared with the control group in other studies and should measure the outcomes before and after the interventions. Given that the study was conducted in only one center (school of Nursing and Midwifery in Shiraz), the generalizability of the findings is not possible. Therefore, it is suggested that the study should be repeated in other schools of nursing in our country and other parts of the world. The fact that the practice was made in different semesters might have an impact on the results; clinical functioning, etc. might be different in that period. There were actually many uncontrollable variables in our study. Therefore, it is suggested to a study in two groups in one semester.

Since the least difference between the two groups was related to the dimension of critical thinking and research aptitude competency, it is suggested that this issue should be given more attention in future internship programs.

Conclusions

This study showed that the nursing students in the internship model group B had a higher mean score of professional competency and lower mean score of anxiety compared to the internship model group A. Given that the internship model group B as a precise and regular program could improve the professional competency of nursing students to a great extent and they experienced mild anxiety during the program, it is suggested that this intervention should be carried out for nursing students and other students who have clinical functions. It is recommended that the internship model group B should be added to the nursing program and curriculum in our country. Since the internship model group B only required detailed planning and we explained it in the intervention section, the model could easily be implemented in different universities.

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Data availability
The data of this study would be available by email to Masoume Rambod.

Declarations

Ethics approval and consent to participate
Research Ethics Committees of Schools of Nursing and Midwifery, Management and Medical Information Science-Shiraz University of Medical Sciences approved this study (IR.SUMS.NUMIMG.REC.1402.027, approval date: 2023-05-28). Participation/non-participation of this study was voluntary. The permission to apply "The Competency Inventory for Registered Nurses" was obtained from Ming Liu by the fourth author of our study. The questionnaires were anonymous. Our study was conducted in accordance with the Declaration of Helsinki. The study purpose, procedure, probable complications and the ways of compensation, and the person responsible for these possible complications in this study were explained in the consent form. The consent to participate was obtained from the nursing students. All of the nursing students signed the consent form. We confirmed that this consent was informed. The results of this study were reported to Nursing and Midwifery School of SUMS.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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