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Investigating the effect of self-evaluation by checklist in learning the principles of drug injection and the satisfaction of nursing students in the pharmacology internship at Zanjan College of Nursing and Midwifery

Background: Among the various assessment tools for learning, self-evaluation is an efficient method that enables students to reflect on their learning. The present study was conducted with the aim of determining the effectiveness of self-evaluation by checklist in learning the principles of drug injection and the satisfaction of nursing students in the pharmacology internship in 2022 at Zanjan College of Nursing and Midwifery.

Method: The present study was a quasi - experimental study that was conducted as a case-control study in the pharmacology internship unit on 36 students. In the case group (18 participants), each student completed the checklist 3 times in the presence of the instructor, after administering the drug, in three consecutive days. But in the control group, only the instructor, like the case group, completed the drug administration checklist. At the end of the internship, the satisfaction level of the students of both groups was measured by a satisfaction questionnaire

Results: 55.56% of the students in the case group were male and 55.56% of the students in the control group were female. The mean and standard deviation of learning on the second and third day were respectively 11.44 ± 1.68 and 14.78 ± 0.548 in the case group and 8.78 ± 1.26 and 8.00 ± 1.45 in the control group, which was statistically significant ($p=0.000$). There was no significant difference in the level of satisfaction in the two groups.

Conclusion: The use of self-evaluation method had a significant effect in training drug administration skills.

Keywords: Self-evaluation, Nursing student, Satisfaction

بحث تأثیر التقييم الذاتي عن طريق القائمة المرجعية في تعلم مبادئ حقن الدواء ورضا طلاب التمريض في فترة تدريب الصيدلة في كلية زنجان للتمريض والقبالة

الخلفية: من بين أدوات التقييم المختلفة للتعلم، يعد التقييم الذاتي وسيلة فعالة تمكن الطلاب من التفكير في تعلمهم. أجريت هذه الدراسة بهدف تحديد مدى فعالية التقييم الذاتي من خلال القائمة المرجعية في تعلم مبادئ حقن الدواء ورضا طلاب التمريض في تدريب الصيدلة لعام ٢٠٢٢ في كلية زنجان للتمريض والقبالة. الطريقة: الدراسة الحالية هي دراسة شبه تجريبية أجريت كدراسة الحالات والشواهد في وحدة تدريب الصيدلة على ٣٦ طالباً. في مجموعة الحالة (١٨ مشاركاً)، أكمل كل طالب القائمة المرجعية ٣ مرات بحضور المدرب، بعد إعطاء الدواء، في ثلاثة أيام متتالية. ولكن في المجموعة الضابطة، قام المدرب فقط، مثل مجموعة الحالات، بإكمال القائمة المرجعية لإدارة الدواء. وفي نهاية التدريب، تم قياس مستوى رضا الطلاب في كلا المجموعتين من خلال استبيان الرضا

النتائج: ٥٥,٥٦% من الطلاب في مجموعة الحالة كانوا ذكور و٥٥,٥٦% من الطلاب في المجموعة الضابطة كانوا من الإناث. كان المتوسط والانحراف المعياري للتعلم في اليوم الثاني والثالث على التوالي 11.44 ± 1.68 و 14.78 ± 0.548 في مجموعة الحالة و 8.78 ± 1.26 و 8.00 ± 1.45 في المجموعة الضابطة، والتي كانت ذات دلالة إحصائية ($p=0.000$). ولم يكن هناك اختلاف كبير في مستوى الرضا في المجموعتين.

الاستنتاج: إن استخدام أسلوب التقييم الذاتي له أثر كبير في التدريب على مهارات إدارة الدواء.

الكلمات المفتاحية: التقييم الذاتي، طالبة التمريض، الرضا

بررسی تأثیر خودارزیابی با چک لیست در یادگیری اصول تزریق دارو و رضایت دانشجویان پرستاری در دوره کارورزی فارماکولوژی دانشکده پرستاری و مامایی زنجان

زمینه و هدف: در میان ابزارهای گوناگون ارزیابی برای یادگیری، خودارزیابی روشی کارآمدی است که دانشجویان را قادر می سازد در یادگیری خود تأمل کنند. مطالعه حاضر با هدف تعیین تأثیر خود ارزیابی توسط چک لیست در یادگیری اصول تزریق دارو و رضایت دانشجویان پرستاری در کارآموزی فارماکولوژی در سال ١٤٠١ در دانشکده پرستاری و مامایی زنجان انجام شد.

روش: مطالعه حاضر یک مطالعه نیمه تجربی بوده که به صورت مورد -شاهدی در واحد کارآموزی فارماکولوژی بر روی ٣٦ دانشجو انجام شد. در گروه مورد (١٨ نفر)، هر دانشجو، بعد از اجرای دارو، در سه روز متوالی، سه بار چک لیست را در حضور مربی تکمیل کرد. در گروه شاهد فقط مربی همانند گروه مورد، چک لیست اجرای دارو را تکمیل نمود. در پایان کارآموزی میزان رضایت دانشجویان هر دو گروه توسط پرسشنامه رضایت سنجی سنجیده شدند.

یافته ها: ٥٥/٥٦ درصد دانشجویان گروه مورد آقا و ٥٥/٥٦ درصد دانشجویان گروه شاهد خانم بودند. میانگین و انحراف معیار یادگیری در روز دوم و سوم به ترتیب در گروه مورد 11.44 ± 1.68 و 14.78 ± 0.548 و در گروه شاهد 8.78 ± 1.26 و 8.00 ± 1.45 بود که از نظر آماری معنا دار بود ($p=0.000$). از نظر میزان رضایت در دو گروه تفاوت معناداری وجود نداشت.

نتیجه گیری: استفاده از روش خودارزیابی در آموزش مهارت اجرای دارو تأثیر بسزایی دارد.

واژه های کلیدی: خودارزیابی، دانشجوی پرستاری، رضایت

زنجان کالج آف نرسنگ اینڈ مڈوائفری میں فارماکولوجی انٹرنشپ میں منشیات کے انجیکشن کے اصولوں کو سیکھنے اور نرسنگ کے طلباء کے اطمینان میں چیک لسٹ کے ذریعہ خود تشخیص کے اثر کی چھان بین

پس منظر: سیکھنے کے لیے مختلف تشخیصی ٹولز میں سے، خود تشخیص ایک موثر طریقہ ہے جو طلباء کو اپنے سیکھنے پر غور کرنے کے قابل بناتا ہے۔ موجودہ مطالعہ زنجان کالج آف نرسنگ اینڈ مڈوائفری میں ٢٠٢٢ میں فارماکولوجی انٹرنشپ میں منشیات کے انجیکشن کے اصولوں کو سیکھنے اور نرسنگ طلباء کے اطمینان کے لیے چیک لسٹ کے ذریعہ خود تشخیص کی تاثیر کا تعین کرنے کے مقصد سے کیا گیا تھا۔

طریقہ: موجودہ مطالعہ ایک نیم تجرباتی مطالعہ تھا جو فارماکولوجی انٹرنشپ یونٹ میں ٣٦ طلباء پر کیس کنٹرول اسٹڈی کے طور پر کیا گیا تھا۔ کیس گروپ (١٨ شرکاء) میں، ہر طالب علم نے انسٹرکٹر کی موجودگی میں، دوائی دینے کے بعد، لگاتار تین دنوں میں ٣ بار چیک لسٹ مکمل کی۔ لیکن کنٹرول گروپ میں، کیس گروپ کی طرح صرف انسٹرکٹر نے منشیات کی انتظامیہ کی چیک لسٹ مکمل کی۔ انٹرن شپ کے اختتام پر، دونوں گروپوں کے طلباء کے اطمینان کی سطح کو اطمینان بخش سوالنامے سے مایا گیا۔

نتائج: کیس گروپ میں ٥٥,٥٦% طلباء مرد تھے اور کنٹرول گروپ میں ٥٥,٥٦% طلباء خواتین تھیں۔ دوسرے اور تیسرے دن سیکھنے کا اوسط اور معیاری انحراف بالترتیب کیس گروپ میں 11.44 ± 1.68 اور 14.78 ± 0.548 تھا اور کنٹرول گروپ میں 8.78 ± 1.26 اور 8.00 ± 1.45 تھا، جو شماریاتی لحاظ سے اہم تھا ($p=0.000$)۔ دونوں گروپوں میں اطمینان کی سطح میں کوئی خاص فرق نہیں تھا۔

نتیجہ: خود تشخیص کے طریقہ کار کے استعمال نے منشیات کے انتظام کی مہارتوں کی تربیت میں ایک اہم اثر ڈالا۔

مطلوبہ الفاظ: خود تشخیص، نرسنگ طالب علم، اطمینان

INTRODUCTION

Evaluation is one of the important parts of the learning process at any level and field. The evaluation of skills can be done at the end of the course or during the course by the teacher or another person. The evaluation method should be trustworthy, reliable, flexible, comprehensive, easy and relevant. It can be done in a short time and is not time-consuming. Another method of evaluation is the student's self-evaluation of what he has learned (1). Self-evaluation is defined as students' participation in making decisions about their learning achievements (2).

Today, studies have shown that students' self-evaluation of their practical skills has more value than the university's routine evaluations, including written and practical exams. Therefore, in many universities, in addition to the professor's evaluation of the student, self-evaluation is also done by the student (3, 4).

Considering that through self-evaluation, students can gain a deep and accurate insight into themselves, and based on this insight, they can have more realistic expectations from educational policymakers, self-evaluation plays a vital role in understanding learning goals, expectations, work improvement, and professional development (5). Self-evaluation is especially useful for students, because it not only keeps them very motivated, interested and involved in this process, but also encourages them to be self-controlled and responsibility (6).

Assessment is not a tool to end a phase of learning, but rather a tool to advance and direct teaching and learning that should be used during the learning period. As a result, in recent years, researchers have witnessed the increasing desire of masters to "assess for learning", because unlike "learning assessment" in many fields, "assessment for learning" has goals beyond determining the level or amount of student learning and it helps them to check and adjust the amount and manner of their learning according to the predetermined criteria. Among the various tools of assessment for learning, self-assessment is an efficient method that enables students to reflect on their learning, identify and examine their learning gaps, and try to find solutions to compensate for their learning problems (7). In the current study, the researcher intends to use self-assessment more to strengthen learning. In Iran, self-assessment as a tool for efficient learning has been noticed by researchers and professors as well (8).

In a research titled comparing the self-assessment of the final year midwifery students of the skills learned during their studies with their evaluation by the instructor, it was found that students can relatively judge their performance like professors and asking students for their own evaluation can improve the evaluation process (9).

In a research titled the effect of continuous self-assessment of students on research self-efficacy and academic progress: A neglected element in curriculum development, the results showed that continuous self-evaluation was effective in increasing students' research self-efficacy and had a positive effect on their academic progress (10).

Pharmacology education for nursing students has been

significantly studied in recent years, especially in relation to clinical skills (11). However, despite such importance, the results of the studies indicate that nurses and nursing students do not have enough pharmacology skills to perform their tasks (12, 13), which of course is more severe in nursing students (14).

In another study that investigated nurses' understanding of their own pharmacology skills, it was found that their knowledge about drug side effects and precautions is weak (15).

In a study conducted by Zarei et al. with the aim of evaluating nursing students' understanding of their important pharmaceutical care skills, the results showed that more than 65% of students rate their pharmaceutical care skills poorly. This finding showed a prominent deficiency in the professional skills of students and indicated a deep gap in learning the necessities of the nursing profession (16).

The new clinical roles that nurses are responsible for today require essentials including the knowledge of pharmacology and the skills of applying its principles in clinical situations. On the other hand, in order to ensure the provision of safe and effective nursing care, nurses need a proper foundation of knowledge and principles of pharmacology (17).

In the pharmacology internship, the student, in addition to learning the drugs, must simultaneously follow the rules such as compliance sterile instructions, not making mistakes, compliance the steps of drug administration, teaching the patient, checking the necessary tests, and how to prepare medicine. In internship courses, studies show that students forget some of these steps at the patient's bedside, therefore, the present study decided to conduct a study with the aim of determining the effect of self-evaluation by checklist in learning the principles of drug injection and the satisfaction of nursing students in the pharmacology internship of Zanjan Faculty of Nursing and Midwifery.

METHODS

The present study was conducted in the second semester of 2022-2023 as a quasi-experimental study. After obtaining permission from the ethics committee of Zanjan University of Medical Sciences, a written introduction letter from respected university officials and consent from nursing students, the researcher started conducting the study.

The present study was conducted in the pharmacology training unit in the neurosurgery department of Ayatollah Mousavi Hospital. This course was presented as a clinical course for all third semester nursing students (36 people). Inclusion criteria included: students who took the pharmacology internship unit in the third nursing semester for the first time and inclination to participate in the research. Exclusion criteria included: Students who were not present on the first day of internship (on the first day of internship, the principles and rules of drug therapy are explained), students who had a history of probation and had more than two absences in internship.

In this way, all 36 students of the third semester were selected and divided into internship groups with the same members at the beginning of the semester. Using the table of random numbers, they were divided into three case

training groups (18 participants) and three control training groups (18 participants). On the first day of the internship, both groups were taught the steps of drug administration, which was one of the important principles of the internship, according to the checklist. In the case group, in the presence of the instructor, who was also the researcher, each student administered the injection medicine at the patient's bedside, and the instructor reminded them of the things they forgot to protect the patient's rights. After administering the drug, the students completed the checklist in the presence of the instructor, answering yes to the items they had done and no to the items they had not done or those which were not noticed by the instructor. Each student completed the checklist 3 times consecutively during the internship. In the control group, all procedures were the same, with the only difference that the student did not complete a checklist after administering the injection drug and in three consecutive days, like the case group, for each student in the control group, the instructor completed the drug administration checklist 3 times at the end of the drug administration task. The researcher, who was also an internship coach, completed the checklist for both groups while he was not aware (was blinded) approximately from the case and control of the groups except for the cases where the student asked a question about the self-evaluation checklist. At the end of the internship, the level of satisfaction of the students of both groups was measured by a satisfaction questionnaire.

The data collection tool included a satisfaction questionnaire that was designed for the first time by Eslami et al. The face and content validity of the questionnaire was confirmed by the comments of 10 professors of Jahrom University of Medical Sciences and the reliability of the questionnaire was calculated with Cronbach's alpha coefficient and reported as 0.94. This questionnaire consisted of two parts: demographic information including (gender, age and average grade point until the previous semester) and 8 questions (facilitating understanding and memorizing the material, creating more interest and motivation, being effective and useful in understanding the material, having Sufficient attraction and excitement, encouragement to participate, feeling more responsible for learning material, willingness to repeat, better quality of learning) that the students expressed their opinion about the questionnaire statements based on a five-point Likert scale from completely agree (4 marks) to completely disagree (1 mark). The minimum score was 8 and the

maximum score was 32 (18). A score of 8-15 was considered as low satisfaction, 16-24 as moderate satisfaction and 24-32 as high satisfaction. At the end of the questionnaire, a question was asked about the level of satisfaction with the internship.

To check learning, the checklist of drug injection steps was used. The checklist was prepared by the researcher after studying the sources and based on the heading of pharmacology internship. The checklist consisted of 15 questions including the stages of drug administration and its score was from 0-15, a student who complied with all items of the checklist received a score of 15 and when he did not comply with any of the items, he received a score of zero. The face and content validity of the checklist was determined by 10 members of the university faculty, and then CVR and CVI were calculated as 0.81 and 0.83, respectively. Its reliability was also measured on 20 nursing students of the third semester of the previous semester who were not under study and were in pharmacology internship, and its Cronbach's alpha coefficient was calculated as 0.87. Descriptive statistics of minimum, maximum, mean, and standard deviation were used to describe quantitative data, and frequency distribution was used for qualitative data. Then, using the Kolmogorov-Smirnov test, the data distribution was determined. Since the data were non-normal, they were analyzed using Mann-Whitney and Wilcoxon tests at a significance level of $P < 0.05$.

RESULTS

The results showed that 55.56% of the students in the case group were male and 55.56% of the students in the control group were female. There was no statistically significant difference between the two groups in terms of gender. The mean and standard deviation of age in the case group was higher than the control group and this difference was statistically significant. The average grade point of the control group was higher than the case group, but the difference between the two groups was not significant.

The results of the comparison of the students' learning rate by the instructor on the second and third days compared to the first day of drug administration in the case group had a statistically significant difference, which is shown in Table 1. The results of the comparison of the students' learning rate by the instructor on the second and third days compared to the first day of drug administration in the control group had a statistically significant difference, which is shown in Table 2.

Table 1. Determining and comparing the amount of student learning by the instructor on the first day with the second and third days of drug administration in the case group

| Variable | Mean ± Standard Deviation | Quarters | | | P-value |
|-------------------------|---------------------------|----------|-----------------|-------|---------|
| | | First | Second (Middle) | Third | |
| Learning the first day | 6.11±1.36 | 5.00 | 6.00 | 7.00 | 0.000 |
| Learning the second day | 11.44±1.68 | 10.00 | 11.00 | 13.00 | |
| Learning the third day | 14.78±0.548 | 15.00 | 15.00 | 15.00 | |

The comparison of the learning rate of administration of injectable drugs in two groups showed that in the case group on the third day, the mean and standard deviation of the students' score was (14.78±0.548), and in the control group it was 8.00±1.45. This difference was statistically significant (p=0.000) and it showed that the students who saw the checklist made fewer mistakes on the second and third day. The results of comparing the learning rate of case and control group students are shown in Table 3. Comparing the level of satisfaction of students in the case and control groups showed that there was no significant difference between the two groups (p=0.815).

DISCUSSION

The results of this study showed that both groups had fewer mistakes during the second and third days of drug administration, but in the case group who completed the self-assessment checklist after the administration of the drug, learning was more on the second and third days than the control group. However, on the first day of comparison, the average learning between the two groups was not different. There was no significant difference between the two groups regarding satisfaction with the internship. According to the researcher's findings, no study was found in the field of using self-evaluation to improve internship learning, so related articles were used in this field.

The results of a study conducted in Norway with the aim of describing and analyzing nursing students' self-evaluation of clinical skills and their need for further training and analyzing possible predictive variables in self-evaluation showed that students had reported the highest self-evaluation scores for their clinical competence in taking full responsibility and needing more education about drug effects and interactions. Although the students gave themselves low points in the use of electronic devices, but they evaluated their need for more training in this field as moderate (19). The present study showed that nursing students felt more needed in the field

of learning drugs.

The study of Azadi et al. in 1400, which had done with the aim of the effect of video self-evaluation training on the knowledge, self-esteem and performance of operating room staff in performing advanced cardiopulmonary resuscitation showed that the visual self-evaluation educational method was effective in improving self-esteem and performance self-evaluation of operating room employees in the medium term. However, in the long term, it means the next 8 weeks, it had no effect. In this study, self-evaluation was used to increase self-esteem and knowledge, and it is somewhat similar to the present study because in our study, self-evaluation improved learning (20).

The results of the study by Zahedmehr et al. in Tehran in 1396 that had investigated the effect of visual self-evaluation training on the awareness and performance of nurses in performing cardiopulmonary resuscitation, and it was also consistent with the results of the present study, showed that the knowledge of nurses in the case group increased significantly immediately after the study compared to before the study (21).

In another study titled social representations of implementing self-evaluation for training French language teaching students was conducted in Tehran University, in the case group, students were responsible for evaluating their learning during the semester. The results indicated an improvement in the performance of the students of the case group and made them more aware of their individual learning strategies and developed self-regulation skills and independency in learning (22).

Self-evaluation by students, when there is a structure and framework for self-evaluation, helps to set goals and control student progress towards these goals (23, 24).

Regarding the satisfaction of internship, a quasi-experimental study had been conducted with the aim of determining the effect of the learning contract on the satisfaction and self-directed learning of nursing students. This study showed that

Table 2. Determining and comparing the amount of student learning by the instructor on the first day with the second and third days of drug administration in the control group

| Variable | Mean ± Standard Deviation | Quarters | | | P-value |
|-------------------------|---------------------------|----------|-----------------|-------|---------|
| | | First | Second (Middle) | Third | |
| Learning the first day | 5.89±1.71 | 5.00 | 6.00 | 7.00 | 0.000 |
| Learning the second day | 8.78±1.26 | 8.00 | 8.50 | 10.00 | |
| Learning the third day | 8.00±1.45 | 7.00 | 8.00 | 9.00 | |

Table 3. Comparison of learning rate of administration of injectable drugs in case and control groups

| Variable | | Learning the first day | Learning the second day | Learning the third day |
|---------------------------|---------|------------------------|-------------------------|------------------------|
| Mean ± Standard Deviation | Case | 6.11±1.36 | 11.44±1.68 | 14.78±0.548 |
| | Control | 5.89±1.71 | 8.78±1.26 | 8.00±1.45 |
| P-value | | 0.732 | 0.000 | 0.000 |

there was no significant difference between the average satisfaction scores in the two groups, the implementation of this method is recommended to educators due to its special attention on strengthening self-directed learning, which is one of the goals of nursing education in the third millennium (25).

In a study conducted by Yoon Hee et al. the effect of self-directed learning on competency in physical assessment, academic self-confidence and learning satisfaction of nursing students was measured and the results showed that Competency in physical assessment was significantly higher in the experimental group. However, academic self-confidence and learning satisfaction were not significantly different between the groups (26).

Another study that investigated students' satisfaction with clinical training using peer groups showed that training using peer groups increases student satisfaction which was contrary to the results of the present study because of the method used in the study, which was different from the present study (27).

The current research had limitations, such as the fact that the participants in this study were third semester nursing students so its results cannot be generalized to other students. The next limitation was the lack of complete blinding of the researcher, considering that this study was designed one-sided blind, but in cases where the student raised a question about the self-assessment checklist, the researcher realized the student's case and control; however, this case did not repeat much. In addition, this research was conducted in a medical center affiliated to Zanjan University

of Medical Sciences, and its results may not be generalizable to centers affiliated to other universities of medical sciences in the country and non-university centers. It is suggested to carry out similar researches in other clinical environments and to compare the self-evaluation method with other modern methods of clinical education.

CONCLUSION

The self-evaluation method in clinical education can strengthen learning by involving students in learning to increase their motivation.

Ethical considerations: Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors. This study was approved by the ethics committee of the research and technology deputy of Zanjan University of Medical Sciences, Ethics code: IR.ZUMS.REC.1400.365

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