

The effect of learning via module versus lecture teaching methods on the knowledge and practice of oncology nurses about safety standards with cytotoxic drugs in Shiraz University of Medical Sciences

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ABSTRACT

Background: Several studies have established that all nurses need continuing education, especially those who are working in oncology wards. In the current programs, there are just two general patterns for teaching: Teacher-centered and student-centered patterns. In this study, the effect of teacher-centered (lecture) and student-centered (module) teaching methods in relation to safety standards with cytotoxic drugs on the knowledge and practice of oncology nurses was compared.

Materials and Methods: This research was a quasi-experimental study with two intervention groups (module and lecture) and a control group. In this study, 86 nurses in Shiraz, Fars province in 2011, who participated in the prescription of cytotoxic drugs to patients were selected and randomly divided into three groups. The module group used a self-directed module, the lecture group was taught by an experienced lecturer in the classroom and the control group did not receive any intervention. Data in relation to knowledge and practice of oncology nurses in the three groups were collected before and 8 weeks after the intervention by using a questionnaire and checklist. To analyze the data paired-samples *t*-test and one way ANOVA analysis were used.

Results: Knowledge and practice scores increased significantly from baseline in both intervention groups, but there was no significant difference between the scores of the two groups. No considerable changes were observed in the control group.

Conclusions: Both module and lecture methods have similar effects on improving the knowledge and practice of nurses in oncology wards. Therefore, considering the advantages of student-centered educational methods, the work load of nurses and the sensitivity of their jobs, we suggest using module.

Key words: Continuing education, Iran, knowledge, lecture, module, oncologic nursing, practice

INTRODUCTION

Continuing education includes a collection of activities, methods and programs that increase the workers' knowledge and improve their performance in order to complete their own tasks and do their jobs.^[1] Therefore, continuing education is one of the factors of human progress and is the most important type of learning experiences because in this type of training, employees acquire experience and knowledge during the work. With the development of technology, knowledge, attitude and behavior of workers should also be changed. Because of its relationship to public health, continuous learning and updating knowledge and

skills in medical sciences is of utmost importance. Hence, lack of information for themselves and those who are benefiting from their services has many disadvantages. Participation in continuing education programs and obtaining the required score is the most common criterion that the specialized medical and nursing centers used to reconfirm the people's medical records.^[2]

Nurses are one of the members of the community health system that need to undergo continuing education. Nursing care and its education has a direct relationship with public health. Due to many changes in treatment and care of patients, different surgical procedures and use of new drugs, nurses are forced to update their information.^[3] Among the nurses, training of oncology nurses is very important, because in the oncology wards, chemotherapy is (cytotoxic drugs) used for treatment of cancer that has many side-effects for patients and those who have occupational exposure to these drugs.^[4,5] For instance, the increasing chance of chromosomal damages,^[6-9] the decrease in the

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immune system,^[10] increasing possibility of infertility and abortion,^[11,12] premature labor,^[13] low birth weight,^[14] irritation of the eyes, skin and mucosa and allergic reactions due to skin contacts, vomiting, headache and dizziness, hair loss and liver damages are the mentioned side-effects.^[12,15] On the other hand, demand for chemotherapy treatment is rising^[16] and regimes are becoming complex. Nurses are primarily responsible for ensuring that patients receive chemotherapy safely and providing the support required enabling patients to cope both physically and psychologically with their treatment. Nurses must be confident about their knowledge, competence and technical skills in order to effectively function in relation to this aspect of care.^[17-19] Therefore, holding continuing education programs for the nurses of these wards is quite necessary.

There are two general patterns in the education programs: The teacher-centered pattern, which focus on the teacher and based on the lecture, students learn the subjects soon and often forget them soon. Lecturing depends on the student being a verbal learner in that information must be understood as it is stated. Even with a power point listing of information, the shelf life of information passed on this way will not be remembered for long. The other pattern, which considers the student's needs and capabilities is the student-centered pattern. For everyone, learning through the lectures during a period of time is inevitable; however, Revision of the traditional teaching methods, such as lecture and the use of student-centered approach is necessary.^[20,21] Therefore, the educational systems have emphasized reconsideration of traditional education methods and development of new educational approaches.

The number of empirical studies related to student-centered teaching especially computer-assisted learning (CAL) within nursing education has increased in recent years. Two studies reported that students achieved higher skill performance scores using CAL module compared with conventional learning methods.^[22,23] Equivalent results in skill performance outcomes were found in some studies,^[24,25] whereas lower skill performance outcomes for students taught using CAL module were reported in other study.^[26] In all these studies, the module is performed through the computer, but in this study, the binding module is used, which does not require the use of computers. In this study, the effect of teacher-centered (lecture) and student-centered (module) teaching methods in relation to safety standards with cytotoxic drugs on the knowledge and practice of oncology nurses was compared.

MATERIALS AND METHODS

This is a quasi-experimental study including 86 nurses of all chemotherapy centers affiliated to Shiraz University of

Medical Sciences, which is involved with the health-care of all patients in Fars province in 2011. All oncology wards had a population of 130 nurses including 90 qualified nurses for participations. Finally, 86 nurses were willing to participate in this study. For ethical considerations, told them this is an approved project. The aim of this study and the procedures were explained to the nurses to obtain their cooperation. Written informed consent was obtained from the nurses to ensure willingness to engage in the study. The researcher maintained anonymity and confidentiality of nurses. Nurses were allowed to choose whether to participate or not, and they had the right to withdraw from the study at any time without penalty. In this study, the number of the samples required for the study was equal to the total study population. This study had 2 intervention groups (lecture and module) and a control group. In order to avoid the information distribution between groups, using simple random method, in Namazi Hospital lecture method (28 individuals) was presented, in Amir hospital module method was used (29 individuals) and the control group included the nurses of oncology wards of Faghihi Hospital, Emam-Reza, Motahari and Amir clinics. The data on demographic information were collected by a questionnaire containing 6 questions. The nurses' knowledge was evaluated by a self-made questionnaire, which was scored 30. This questionnaire consisted of 25 multiple choice questions (1 score for each), and 10 True or False questions (0.5 core for each). Furthermore, to study the nurses' practice, a checklist was used. This checklist has been used in Hazrati's study.^[27] In this study, only the protective aspects that should be practiced by staff during medication administration were evaluated. Therefore, five experts in this field revised it and some protective remarks were added to the checklist and the none-protective remarks were eliminated. The checklist included 50 practical cases in three fields of preparing (25 cases), administrating (12 cases), and disposing of cytotoxic drugs (13 cases), all having the same value as 1. The total score was 50. The data about knowledge and practice of three groups (lecture, module and control) were collected before and 8 weeks after the intervention. For an exact observation, the personnel's practice in two opposite shifts was observed and mean of the two observations was considered as the performance for each individual.

The questionnaire and the checklist were provided through the review of the literature. As to its content validity, the opinions of five expert persons in this field were applied for its reliability, the statistical test of Kuder-Richardson 20 was applied for questionnaire ($\alpha = 0.9$). For reliability of the checklist, inter-observer reliability test was used; the obtained correlation coefficient was 0.94.

Educational lecture was held for the lecture group lasting 5 h. The class was repeated for 3 times, so all the

nurses in the lecture group could participate in it. In the module group, an educational module which included the classroom notes in 118 pages was given to the group. The researcher went to Amir Hospital, 2 h/week to answer their questions. Furthermore, the researcher's e-mail and phone number were available so as to meet any demands. The control group did not receive any education. To statistically analyze the data, SPSS software (version 16) was applied. To analyze the data, paired-samples *t*-test and one-way ANOVA were used.

RESULTS

The finding showed that statistically there was no significant difference between the mean age, marital status, work experience and the type of recruitment among the three groups. The study of the results 8 weeks after the intervention by the one-way ANOVA indicated an increase in the knowledge and improvement of the practice level in the experiment groups. However, the *post hoc* test of Tukey HSD showed that the lecture and module educational methods do not have a statistically significant difference in the increase of knowledge ($P = 0.22$) and the improvement of the practice ($P = 0.75$). No significant difference was shown in the both of knowledge and practice in the control group [Table 1].

The findings of this study showed that the three groups were statistically equal in the knowledge ($P = 0.49$), but they showed a difference in the practice before the intervention ($P < 0.001$). The control group was weaker in practice in comparison with the other two groups. Of course, the lecture and module groups had not a significant difference ($P = 0.12$). Therefore, to compare the three groups, the mean of knowledge and practice score variations were used. Through the statistical test of one-way ANOVA the results illustrated that teaching through lecture and module methods has a positive and significant effect on increasing the knowledge ($P < 0.001$) and improvement of the practice ($P < 0.001$). *Post hoc* test of Tukey Honestly Significant Difference (HSD)

showed that there was not a significant difference between the lecture group and module group in the increase of knowledge ($P = 0.86$) and improvement of practice ($P = 0.48$) [Table 2].

DISCUSSION

The goal of this study was to compare the impact of lecture and module methods in relation to protective standard of working with cytotoxic drugs on the knowledge and practice of nurses in oncology wards. The findings support the use of a self-directed module as an alternative to a face-to-face teaching session. This finding is similar to those from earlier studies reported in the nursing literature that found inconclusive evidence to support the superiority of one method over another on acquisition and retention of knowledge or practice or both of them.^[28-30] There are earlier studies which are in contrast with the finding of this study because they found evidence to support the superiority of one method over the other.^[31,32]

Since continuous education and updating knowledge and skills in medical science that deals with public health is very important, on the other hand the nurses, because of working in different shifts, do not have the opportunity to participate in face-to-face teaching sessions; self-educating methods are suggested for them. Nurses and physicians, especially in small areas, might have difficulties during their attendance in such classes. Using self-instruction methods such as pamphlets and educational modules, which are an approach to education could be a better idea so that the individual can control the time and place of learning. Furthermore, educators who are involved in the education of adult students have to be informed about their learning interests and priorities. Several studies have shown that when adults are involved in consistent learning, they have a better perception in learning. Another feature of adults is their tendency to choose the time and place for learning. Hence, application of self-instruction method is so effective in comparison with lecture method.^[20,33]

Table 1: Comparison of the mean scores of knowledge and practice of the participants in relation with protective standards of cytotoxic drugs before and 8 weeks after the intervention among the 3 groups of lecture, module and control

Mean scores groups	Knowledge before intervention		Knowledge 8 weeks after intervention		Practice before intervention		Practice 8 weeks after intervention	
	Mean±SD	P value	Mean±SD	P value	Mean±SD	P value	Mean±SD	P value
Lecture	12.85±4.35	0.49	19.28±4.40	<0.001	22.58±3.76	<0.001	28.48±2.81	<0.001
Module	11.87±2.52		18.77±3.08		24.12±2.28		29.55±1.90	
Control	11.60±3.32		12.06±3.06		17.20±2.52		17.15±2.28	
	<i>Post hoc</i> test for knowledge in intervention groups				<i>Post hoc</i> test for practice in intervention groups			
	P value				P value			
	0.22				0.75			

Table 2: Comparison of the mean scores of changes of knowledge and practice with protective standards of cytotoxic drugs between the 3 groups of lecture, module and control before and 8 weeks after the intervention

Mean scores group	Knowledge		Practice	
	Mean±SD	P value	Mean±SD	P value
Lecture	6.42±4.53	<0.001	5.89±2.59	<0.001
Module	6.89±2.92		5.43±1.82	
Control	0.46±1.86		-0.05±0.36	
	<i>Post hoc</i> test for knowledge in intervention groups		<i>Post hoc</i> test for practice in intervention groups	
	P value		P value	
	0.86		0.48	

The major limitation of this study is that by only educating nurses cannot improve their practice. Because the nursing practice is influenced by various organizational (e.g., presence or absence of facilities) and individual factors (e.g., nurses' attitudes). Therefore, findings from this phase of the study must be interpreted with caution.

CONCLUSION

The major findings of this study confirm previous research in demonstrating equivalency between self-education and conventional teaching methods; this is in itself a valuable finding. Given the ongoing debate about clinical skills education, and the increasing use of self-directed learning within education, the findings are timely and provide evidence that self-education is at least as effective as conventional methods when used to teach handling of cytotoxic drugs. While further research is required to investigate the application of self-education (module) to a wider variety of clinical skills, the study findings provide impetus to look beyond conventional skills teaching practices to more innovative, flexible methods.

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REFERENCES

- Salehi P, Tabatabaei A. Continuing medical education and guides to handle of work shop. 1st ed. Tehran: Ferdose; 1992. p. 613-8.
- Litzelman DK, Stratos GA, Marriott DJ, Skeff KM. Factorial validation of a widely disseminated educational framework for evaluating clinical teachers. *Acad Med* 1998;73:688-95.
- Haynes RB, Davis DA, McKibbon A, Tugwell P. A critical appraisal of the efficacy of continuing medical education. *JAMA* 1984;251:61-4.
- Groenwald L, Goodman M, Hansen M, Henke C. *Cancer Nursing Principle and Procedure*. 4th ed. Boston: Jones and Bartlett publishers; 1993. p. 203-5.
- Williams-Brown S, Singh GK. Epidemiology of cancer in the United States. *Semin Oncol Nurs* 2005;21:236-42.
- Ansari-Lari M, Saadat M, Shahryari D. Sister chromatid exchanges and micronuclei in lymphocyte of nurses handling antineoplastic drugs. *Iran J Public Health* 2001;30:37-40.
- Kopjar N, Garaj-Vrhovac V, Kasuba V, Rozgaj R, Ramić S, Pavlica V, et al. Assessment of genotoxic risks in Croatian health care workers occupationally exposed to cytotoxic drugs: A multi-biomarker approach. *Int J Hyg Environ Health* 2009;212:414-31.
- Testa A, Giachelia M, Palma S, Appolloni M, Padua L, Tranfo G, et al. Occupational exposure to antineoplastic agents induces a high level of chromosome damage. Lack of an effect of GST polymorphisms. *Toxicol Appl Pharmacol* 2007;223:46-55.
- Barale R, Sozzi G, Toniolo P, Borghi O, Reali D, Loprieno N, et al. Sister-chromatid exchanges in lymphocytes and mutagenicity in urine of nurses handling cytostatic drugs. *Mutat Res* 1985;157:235-40.
- Biró A, Fodor Z, Major J, Tompa A. Immunotoxicity monitoring of hospital staff occupationally exposed to cytostatic drugs. *Pathol Oncol Res* 2011;17:301-8.
- Valanis BG, Hertzberg V, Shortridge L. Antineoplastic drugs. Handle with care. *AAOHN J* 1987;35:487-92.
- Valanis BG, Vollmer WM, Labuhn KT, Glass AG. Association of antineoplastic drug handling with acute adverse effects in pharmacy personnel. *Am J Hosp Pharm* 1993;50:455-62.
- Fransman W, Roeleveld N, Peelen S, de Kort W, Kromhout H, Heederik D. Nurses with dermal exposure to antineoplastic drugs: Reproductive outcomes. *Epidemiology* 2007;18:112-9.
- Mennik F, Kennedy MS. Caution for nurses working with chemotherapy. *Am J Nurs* 2007;107:19.
- Connor TH, McDiarmid MA. Preventing occupational exposures to antineoplastic drugs in health care settings. *CA Cancer J Clin* 2006;56:354-65.
- Martin S, Larson E. Chemotherapy-handling practices of outpatient and office-based oncology nurses. *Oncol Nurs Forum* 2003;30:575-81.
- Sessink PJ, Boer KA, Scheefhals AP, Anzion RB, Bos RP. Occupational exposure to antineoplastic agents at several departments in a Hospital. Environmental contamination and excretion of cyclophosphamide and ifosfamide in urine of exposed workers. *Int Arch Occup Environ Health* 1992;64:105-12.
- Sessink PJ, Wittenhorst BC, Anzion RB, Bos RP. Exposure of pharmacy technicians to antineoplastic agents: Reevaluation after additional protective measures. *Arch Environ Health* 1997;52:240-4.
- Nygren O, Lundgren C. Determination of platinum in workroom air and in blood and urine from nursing staff attending patients receiving cisplatin chemotherapy. *Int Arch Occup Environ Health* 1997;70:209-14.
- De Tornay R. *Strategies for teaching nursing student*. 2nd ed. New York: John Wiley; 1982. p. 148-80.
- Safari M, Yazdanpanah B, Ghaforian H, Yazdanpanah B. Comparing the effect of lecture and discussion methods on students learning and satisfaction. *Iran J Med Educ* 2006;6:59-64.
- Beeckman D, Schoonhoven L, Boucqué H, Van Maele G, Defloor T. Pressure ulcers: E-learning to improve classification by nurses and nursing students. *J Clin Nurs* 2008;17:1697-707.
- Kaveevitichai C, Chuengkriankrai B, Luecha Y, Thanooruk R, Panijpan B, Ruenwongsa P. Enhancing nursing students' skills in

- vital signs assessment by using multimedia computer-assisted learning with integrated content of anatomy and physiology. *Nurse Educ Today* 2009;29:65-72.
24. Kelly M, Lyng C, McGrath M, Cannon G. A multi-method study to determine the effectiveness of, and student attitudes to, online instructional videos for teaching clinical nursing skills. *Nurse Educ Today* 2009;29:292-300.
 25. Bloomfield J, Roberts J, While A. The effect of computer-assisted learning versus conventional teaching methods on the acquisition and retention of handwashing theory and skills in pre-qualification nursing students: A randomised controlled trial. *Int J Nurs Stud* 2010;47:287-94.
 26. Reime MH, Harris A, Aksnes J, Mikkelsen J. The most successful method in teaching nursing students infection control - E-learning or lecture? *Nurse Educ Today* 2008;28:798-806.
 27. Hazrati M, Torabizade K, Reisi H, Pasyar N. Exploring the effect of educating standards instructions on administration of antineoplastic drugs in chemotherapy center in Shiraz. *Hormozgan Med J* 2005;12:103-7.
 28. Jenkins S, Goel R, Morrell DS. Computer-assisted instruction versus traditional lecture for medical student teaching of dermatology morphology: A randomized control trial. *J Am Acad Dermatol* 2008;59:255-9.
 29. Karimi M, Kazemi M, Shabani Sh, Vaziri R. Comparing the effects of lecture presentation and pamphlet on knowledge and attitude of female senior students in Sirjan High School about AIDS. *J Hormozgan Univ Med Sci* 2006;10:285-90.
 30. Peroz I, Beuche A, Peroz N. Randomized controlled trial comparing lecture versus self studying by an online tool. *Med Teach* 2009;31:508-12.
 31. Beeson SA, Kring DL. The effects of two teaching methods on nursing students' factual knowledge and performance of psychomotor skills. *J Nurs Educ* 1999;38:357-9.
 32. Jeffries PR. Computer versus lecture: A comparison of two methods of teaching oral medication administration in a nursing skills laboratory. *J Nurs Educ* 2001;40:323-9.
 33. Saif AA. *Educational psychology: Psychology of learning and instruction*. 6th ed. Tehran: Dowran; 2009. p. 235.

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