Pharmacophore

ISSN-2229-5402

Journal home page: http://www.pharmacophorejournal.com

Pharmacophore
an International Journal
ISSN 2229-5402

COMPARİSON OF SOFTWARE BASED VERSUS WRİTTEN-BASED PHARMACEUTİCAL RETRAİNİNG İNTERVENTİONS İN İMPROVİNG KNOWLEDGE AND SATİSFACTİON LEVEL OF CCU NURSES

Zohreh Parsayekta[1] ,Hooman Shahsavari[2] ,Mahsa Haji Mohammad Hoseini[3*], Mirsaeed Yekaninejad[4] , Mahdieh Haji Mohammad Hoseini[5] ,Mohammad Parvaresh-Masoud[6] ,Leila Ghanbari Afra[7] , Mehdi Safarabadi[8]

1. ***Ph.D., professor, Nursing faculty, Tehran University of Medical Sciences, Tehran, Iran***
2. ***Ph.D., Assistant professor, Nursing faculty, Tehran University of Medical Sciences, Tehran, Iran***
3. ***M.Sc., Paramedical faculty, Qom University of Medical Sciences, Qom, Iran***
4. ***Ph.D., Assistant professor, Health school, Tehran University of medical sciences, Tehran, Iran***
5. ***M.Sc. of information technology engineering, Qom University, Qom, Iran***
6. ***M.Sc., Paramedical faculty, Qom University of medical sciences, Qom, Iran***
7. ***[7]M.Sc. of critical care nursing, Kamkar-arabniya hospital, Qom university of medical sciences, Qom,Iran***
8. ***Instructor, M.sc in nursing, Department of paramedical sciences, Arak University of medical sciences, Arak, Iran***

ARTICLE INFO

Received:
03th Jun 2017
Accepted:
29th Nov 2017
Available online:
14th Dec 2017

Keywords: *knowledge, educational software, writing package, retraining, Iran*

ABSTRACT

Background: Participation in the medicinal treatment process is a basic nursing skill. The need for prevention and correction of medication errors, highlight the necessity of continuous training of nurses. this study aimed to evaluate the effects of two methods of medicinal retraining with educational software and writing packages on the levels of knowledge and satisfaction in CCU nurses.

Method: This study is a non-randomized controlled cross-over trial with two study groups and a before-after design. A total of 72 subjects used an educational software or writing package for 6 weeks. The posttest was conducted twice, one week after and two months after the completion of the intervention. The satisfaction level of nurses was measured one week after the completion of the intervention.

Results: The mean and standard deviation of both groups had a significant increase in terms of knowledge level ($p<0.05$), with no significant difference between the methods of education ($p>0.05$). In the follow-up retest, no significant difference was observed in the scores of knowledge in both groups compared with the pretest ($p>0.05$). In addition, nurses were satisfied with both methods, but no significant difference was observed between the methods ($p>0.05$).

Conclusion: Results showed that the education methods had similar effects on improvement of learning and satisfaction of learners; therefore, it is recommended to select the self-study method, and if possible, both methods are made available to allow nurses select their preferred method.

Copyright © 2013 - All Rights Reserved - Pharmacophore

To Cite This Article: Zohreh Parsayekta ,Hooman Shahsavari ,Mahsa Haji Mohammad Hoseini*, Mirsaeed Yekaninejad , Mahdieh Haji Mohammad Hoseini ,Mohammad Parvaresh-Masoud,Leila Ghanbari Afra, Mehdi Safarabadi, (2017), "Comparison of software based versus written-based pharmaceutical retraining interventions in improving knowledge and satisfaction level of CCU nurses", ***Pharmacophore, 8(6S),*** *e-1173359.*

Introduction

of technology and skills as well as paying attention to patient's improvement and safety (1). Pharmacotherapy is a joint role of nurses, physicians, and pharmacists (2). In the meantime, the role of nurses is of particular importance (3). Any

Corresponding Author: Mahsa Haji Mohammad Hoseini, M.Sc., Paramedical faculty, Qom University of Medical Sciences, Qom, Iran

incapability or incompetency in this process causes harm to patients and impose additional costs on them and the society (4). Prevention of medication errors in intensive care units, including CCUs, is of crucial importance (5). Patients in intensive care units need careful treatment and attention provided at every moment, which may increase error rate in their care(6, 7). According to studies, nurses' unawareness of drug information is one of the major factors contributing to medication errors, while medication-related risks are not associated merely with their side effects; in fact, many errors occur during the process of administration, distribution, and executing orders (8-10). The need for prevention and correction of medication errors, along with rapid development of medical sciences highlight the necessity of continuous training of medical community (11). Although the medical community is willing to participate in continuing education programs for various reasons, several factors hinder their access to these programs, such as family involvement, tiredness from working hours, lack of adequate motivation, and lack of alternative staff (12). On the other hand, lack of attention to the educational needs of nurses, poor quality of provided programs (13), abundant shortcomings in training facilities, and lack of skilled manpower for the administration of and supervising the training programs result in their inappropriate and incorrect implementation (14). Despite a long history of implementing continuous education programs for nurses, they seem to have no positive effects on improving professional practice and nursing quality (15-17). Numerous studies have been conducted so far using different educational methods, each with distinct characteristics (18). Self-learning is a continuous education method which includes a series of individual activities performed by individuals based on their own personal interest, where they adopt a variety of ways other than collective continuing education programs in order to promote their scientific and practical knowledge (19). In addition, learners are not required to leave their workplace and can be trained according to their own schedule (20). Given their brief information, writing packages overcame the shortcomings of thick, bulky, and complicated textbooks and have found an independent role in education (21, 22). On the other hand, the use of computers can also increase learners' attraction, motivation, and computer skills (23).

Particular attention has been currently paid to measuring the satisfaction of nurses (24). Considering the satisfaction of nurses is necessary not only due to its impact on nurses as the main providers of health services but also since it can affect patients in health systems (25).

Accordingly, this study aimed to evaluate the effects of two methods of medicinal retraining with educational software and writing packages on the levels of knowledge and satisfaction in CCU nurses.

Methodology

Data collection

After obtaining the necessary License, the researcher attended the study environment (two hospitals in Qom) and obtained the approval of the respective authorities. The samples were selected through convenience sampling, and each hospital was considered as a group because it was impossible to randomly assign the subjects into self-learning groups with educational software and writing packages due to time constraints and the potential impact of groups on each other. The cross over method was used to optimize the control of the study so that the educational content was divided into packages A and B, and each group received both packages in two forms of intervention (software and writing package). Accordingly, the CCU nurses in one hospital randomly received pharmaceutical package A, as educational software, and the pharmaceutical package B, as the educational writing package. The nurses in the second hospital received pharmaceutical package A, as educational writing package, and the pharmaceutical package B, as the educational software. The educational writing package consisted of a series of sheets including pharmacological information such as Persian and English names, classification, indications, contraindications, mode of use, nursing care, patient training, and pharmacological calculations of common drugs used in CCUs (30 drugs), along with 6 pamphlets, 2 educational posters, and medicinal calculations methods. The educational software contained medicinal information written with the C# programming language and with the ability to comprehensively search drug information and perform drug calculations. It included all information of the educational writing package. Inclusion criteria were nursing degree or higher, willingness to participate in the research, the ability to use computers for bachelor's degree in nursing and exclusion criteria were a reluctance to continue participating in the study, leaving for more than a week throughout the study, and absence at posttest. At the first session, each group was informed separately on the use of interventions, the study's objective, and the interventions' importance. They were also ensured that the information would remain confidential, and they were not required to write their names. Those nurses who did not wish to participate in the study were excluded (13 persons). The staff was then asked to use the educational writing package and software for 6 weeks. During this session, the researcher also provided a phone number to the subjects to ask him any problems or questions regarding the application of the software or writing package. In addition, the researcher attended CCUs of both hospitals for several times during the study to resolve the staff problems and questions.

In order to compare the nurses' pharmaceutical information before and after the intervention, two questionnaires related to medicines of package A and medicines of package B were given to both groups in the form of pretest and posttest. The posttest was performed twice on the subjects; a week and 2 months after the intervention. The measuring tool in this study consisted of 3 questionnaires: a 5-item demographic information questionnaire including age, gender, work experience, educational qualification, and work experience in CCU; the knowledge level inventory which included multiple choice questions in the field of CCU medicines information which was scored as zero and one; and a researcher-made

questionnaire, whose validity and reliability was assessed to measure the level of satisfaction of both hospitals' staff with the performed intervention. Finally, the obtained data were analyzed using SPSS.

The validity was determined through content and face validity. To this end, the researcher developed a blueprint table edited based on the content of software and writing packages and the questionnaires with respect to the supervisors and corrective comments of 10 members of the Nursing and Midwifery School of Tehran. The final questionnaire was approved, edited, and used after applying the supervisors' comments and the suggestions. The reliability of the information collecting tools in terms of internal consistency was determined using Cronbach's alpha as 0.71.

Finally, analysis of covariance and multiple linear regression methods were used to compare the variations in nurses' knowledge level over time in both groups.

Ethics committee approval number: 93/د/250/312

Results

The data was entered into the statistical package for the social science (SPSS Version 16.0), after coding the information recorded in the questionnaires.

Demographic characteristics of participants

From July 2014 to November 2015, 72 CCU nurses were recruited in the study. Random allocation of samples was not possible. So, group, I included 36 CCU nurses of a hospital, who underwent drug An information by software-based and drug B information by written-based retraining program. Group II included 36 CCU nurses of another hospital, who underwent drug An information by written based and drug B information by software-based retraining program. There was not a statistically significant difference in terms of gender, age, work experience, CCU Work experience and continuing medical education between participants of two groups (p>0.05). The effect of education variable was controlled so that 34(94.4%) of nurses had a bachelor degree and 2(5.6%) of them had Master degree in both groups. Table 1 represents demographic Characteristics of participants.

The effect of intervention and time on Nurses' knowledge

Using rANOVA, the result of "Mauchly tests for Sphericity" showed that, at the significance level of < 0.05 the sphericity hypothesis was rejected for both groups$\left(\left(\chi_A^2 = 27.477, P_A < 0.001\right), \left(\chi_B^2 = 12.314, P_B = 0.002\right)\right)$; therefore, degrees of freedom were corrected by using Greenhouse-Geissure estimator$\left((\varepsilon_A = 0.753), (\varepsilon_B = 0.860)\right)$.

The result from rANOVa and Bonferroni's pairwise comparison procedure indicated that mean Knowledge of CCU nurses about drug A was 13.04 ± 0.42 before the intervention, which statistically significantly reached to 14.41 ± 0.43 one week after intervention (P=0.001). Nurses' knowledge considerably decreased to 13.30 ± 0.46 two months after intervention compared to one week after intervention (p<0.001). Despite increasing in the mean knowledge of nurses two months after intervention compared to before intervention, no statistically significant difference was observed (P>0.99).

Nurses' knowledge about drug B one week after the intervention was considerably higher than its value on before intervention and two months after intervention (P<0.001, p<0.001). There were not a significant differences between nurses' knowledge before and two months after intervention (0.37).

In the assessment of the effectiveness of two retraining procured on nurses' knowledge about drug A and B, it was found that there was not a significant difference between software based and written based retraining programs in term of nurses' knowledge improvement (P=0.55, P=0.52) (Table2).

Satisfaction of nurses with written-based and software-based retraining procedures

The result from independent samples t-test showed that group I nurses' satisfaction with written-based retraining program(47.28 ± 2.11) was not significantly different from group II (47.28 ± 1.88) (P>0.99). Also, there was not found a statistically significant difference in satisfaction of nurses about software-based retraining program between group I and II $((47.69 \pm 2.44), (47.25 \pm 2.13))$ (P=0.63). In a comparison of satisfaction level of nurses with between written-based (47.28 ± 1.40) and software-based (48.47 ± 1.61)retraining procedures, there was not a considerable difference (P=0.50).

Discussion

This study aimed at evaluating the effect of two methods of medicinal retraining with educational software and writing packages on the levels of knowledge and satisfaction of CCU nurses. Results showed that both medicinal retraining methods increased the knowledge and satisfaction levels of nurses a week after the intervention; however, no significant difference was found between the methods in terms of increase in the level of knowledge and satisfaction. No significant difference was observed between the follow-up retest, performed two months after the intervention, and the pretest in terms of increase in knowledge level. These findings are consistent with the studies which compared educational methods, indicating the effectiveness of all forms of education on learners, while they also have similar effects.

In a research by Abdelaziz et al. (2011), the electronic program was evaluated versus traditional method in nursing students. They concluded that nurses' knowledge was significantly increased immediately, and two months after the intervention (26). The results of that research are consistent with the present study regarding the immediate increase in knowledge after training, but inconsistent with it in terms of increase in knowledge two months after intervention (27). Compared nursing care training in air medical services through two methods of lecture and electronic training. They revealed that e-learning is

an effective way to preserve and maintain knowledge four weeks after intervention; this is also not consistent with the current study.

Another study by Omrani et al. in 2012 aimed at comparing the effects of speech- and electronic-based education and showed that increase in the posttest scores was significantly higher than pretest scores, which is consistent with the present study (28). Bloomfield et al. (2010) conducted a research entitled the impact of computer-assisted learning compared with the traditional teaching method of acquisition and maintenance of hand washing theory in nursing students. Their results showed that despite a significant increase in knowledge in posttest, there was no significant increase in nurses' knowledge after eight weeks in both groups (29). These results are consistent with the present study.

A research was carried out in 2009 by Khakbazan et al. to evaluate the impact of two methods of lecture and educational package on girls' knowledge about adolescent health. The findings showed that the mean score of knowledge after training was significantly increased in both groups before and after education ($p<0.001$), which was consistent with the present study. This study also suggests the higher effectiveness of the educational package compared to lecture (30). Another study by Kermansavari et al. compared the impact of education with booklets and videos on knowledge and revealed that both methods increased the before study knowledge of students (31), which is consistent with the current research.

In a study conducted in 2011 by Khorrami-Rad et al., it was revealed that compact discs and booklets can increase awareness of general practitioners, while the compact disc was significantly more effective than a booklet. In this regard (22), their results were not consistent with the present study. In addition, a study in 2009 by Temiz and Akuner showed that the posttest scores in each group of students educated using computer and textbook were statistically improved compared with the pretest scores, and the scores of the computer-assisted group were significantly higher than the other group (29). This may be attributed to the unawareness and lacking adequate skills of nurses to work with computers. This problem can be solved through holding computer proficiency courses.

A study was conducted by Aleman et al. to assess the impact of competitive learning using computer compared with the conventional teaching method on the acquisition and maintaining knowledge in nursing students. The results showed that both methods had a significant impact on students' knowledge, but the methods produced similar results in maintaining knowledge after ten weeks (32), which is consistent with the present study.

In a research conducted by Hale et al. in 2009, the mean level of satisfaction of two online and classroom educational groups was estimated through asking similar questions (33). Their results showed a similar satisfaction which is in agreement with the present study. These findings are also in line with the results obtained by Reime et al. (2008), who reported that the satisfaction of the virtual method was similar to that of the traditional method, and students were satisfied by both methods (34). In another study conducted by Khoobi in 2012 to compare the learning and satisfaction in nursing students who were trained using the compact disc and traditional methods, both methods had a similar effect on satisfaction (16); this was consistent with the present study.

A number of studies yielded results inconsistent with this research, such as the study of Mohammadi Rizi et al. (2014), who compared the impact of electronic and booklet learning. After data analysis, they concluded that satisfaction obtained by e-learning was significantly higher than the booklet learning. After comparing the impact of education on communication skills of the health workers through lecture and printed materials on the satisfaction of health centers clients (35), Baghiani Moghadam et al. (2012) found that lecture was more effective than the printed materials (36).

These results indicate that e-learning has created satisfaction comparable with that of writing package in nurses, and this educational method is effective.

The study had some limitations, the most important of which was the probable lack of use of the software or the booklet by the subjects. To monitor the implementation of the intervention, the researchers continuously attended the unit and made phone calls to the unit's chief to ensure their use. However, it is suggested to perform further studies with more samples and in other topics related to nursing. In addition, further investigations can be carried out comparably to determine the durability of information.

Conclusion

Results showed that education through writing packages and electronic software had similar effects on increasing learners' knowledge and satisfaction; therefore, it is recommended to select the self-study method (including writing and software packages) for continuous training of nurses according to the status and conditions of learners. If possible, both methods can be made available to allow nurses to select their preferred one.

References

1. HajiHoseini H. Basic skills and intravenous therapy at the end of third year students. Journal of oromiye Nursing and Midwifery. 2011;10(2):183-9.
2. Department of Health. Building a Safer NHS for Patients: Improving Medication Safety. The Stationary Office, London: Department of Health 2004.
3. S. Rahimi, Seyyed-rasouli. A. Nurse's drug precautions awareness. IJN. 2004;16(36):53-6.

4. Panjavini S. Prevalence and types of medication errors nursing personnel employed in the educational centers of Sanandaj medical. Iranian Journal of Nursing Research. 2006;1(1):64-59.
5. Jane E, Richard C, Jesse E, Robert L, Patrick G, John C. Medical errors in acute cardiac care. Circulation,106, 2623-262. 2002.
6. Nasiri E, Babatabaryazdi H, Mortazavi Y. Drug calculation ability of nurses in ICU. Journal of Critical Care Nursing. 2009;2(3):113-5.
7. Santamaria N, Norris H, Clayton L, Scott D. Drug calculation competencies of graduate nurses. Collegian. 1997;4(3):18-21.
8. Le Grognec C, Lazzarotti A, Marie-Joseph D, Lorcerie B. [Medication errors resulting from drug preparation and administration]. Therapie. 2004;60(4):391-9.
9. Leape LL, Bates DW, Cullen DJ, Cooper J, Demonaco HJ, Gallivan T, et al. Systems analysis of adverse drug events. Jama. 1995;274(1):35-43.
10. Suzani A, Bagheri H, Poorheidari M. Factors affecting medication errors by nurses in the hospital wards of Imam Hussein. Journal of Shahrood University of Medical Sciences. 2009;2(8):3-13.
11. Patelarou E, Vardavas CI, Ntzilepi P, Sourtzi P. Nursing education and practice in a changing environment: the case of Greece. Nurse Education Today. 2009;29(8):840-4.
12. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of e-learning in medical education. Academic medicine. 2006;81(3):207-12.
13. Farmani P, Zeighami M. Viewpoints of the nurses in social security hospital of karaj and shahriar on nursing continuing education (2009). Iranian Journal of Medical Education. 2011;3(11):336-8.
14. Ebrahimi H, Mohammadi Hosseini F, Amirnia M, Mehraee A, Jamali V, Hejazi SA. Factors Influencing Nurses' Participation in Continuing Education Programs in Tabriz University of Medical Sciences. Iranian Journal of Medical Education. 2012;12(7):518-26.
15. Ebadi A, Amerioun A, Tavakkoli H, Ehsan T, Mousavi M, Momeni K. Survey of effective factors on nursing graduated motivation to participate in job training programs in affiliated baqiyatallah university hospitals. Iranian Journal of nursing Research. 2012;6(23):32-40.
16. Khobi M. Comparing learning and satisfaction of the third year undergraduate nursing students in Tehran University of Medical Sciences in two methods: traditional education and CD. Thesis Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences. 2011.
17. Phillips JM. Strategies for active learning in online continuing education. The Journal of Continuing Education in Nursing. 2005;36(2):77-83.
18. Shabani H. Educational skills. Tehran, Iran, Samt2012.
19. Mirshahzadeh N, Tootoonchi M. The Quality of Books, Questions and Teaching Method of Self-Learning in Continuing Medical Education: The Viewpoints of Self-learning Program's Participants in Isfahan University of Medical Sciences. Iranian Journal of Medical Education. 2007;7(1):129-36.
20. Davis M, Harden R, Laidlaw J, Pitts N, Paterson R, Watts A, et al. Continuing education for general dental practitioners using a printed distance learning programme. Medical education. 1992;26(5):378-83.
21. Herrick CA, Jenkins TB, Carlson JH. Using Self-Directed Learning Modules: A Literature Review. Journal for Nurses in Professional Development. 1998;14(2):73-80.
22. KhoramiRad A, Heidari A. Comparison of Two Self-Learning Methods (CD-Rom or Booklet) for Physician Education about Reporting Diseases Cases. Iranian Journal of Medical Education. 2011;11(2).
23. Kaveevivitchai 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 education today. 2009;29(1):65-72.
24. Omidvari S. Satisfaction of patients of health centers 2008. Available from: http://www.salamatiran.com/NSite.
25. jahangir F, pazargadi M, mahfozpoor S, A. ab. Job satisfaction of nurses in the surgical wards of educational hospitals affiliated to Shahid beheshti University of medical sciences. Faculty of nursing of Midwifery quarterly. 2006;16(55):20-7.
26. Abdelaziz M, Kamel SS, Karam O, Abdelrahman A. Evaluation of E-learning program versus traditional lecture instruction for undergraduate nursing students in a faculty of nursing. Teaching and Learning in Nursing. 2011;6(2):50-8.
27. Farshi F, babatabararzi h, mahmoodi h, mokhtarinoori j. Comparison of nursing care in air transport in both lecture and eLearning. Journal of Military Medicine. 2012;14(1):27-31.
28. Omrani s. Comparison of two methods of lecture-based training and e-learning with Reigeluth and Merrill pattern on learning and motivation. Journal of Medical Education Development. 2012;9(2):143-52.
29. 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. International Journal of nursing studies. 2010;47(3):287-94.

30. Khakbazan z. Comparison of two methods of teaching (lectures and training packages) on knowledge on adolescent health. hayat. 2009;14(1):41-8.
31. Kermansaravi F, Emani M, Naderifar M, Shafiee S. The effect of education with film display and educational booklets on knowledge and attitude of girl students towards AIDS. Journal of Research & Health. 2013;3(1):278-85.
32. Alemán JLF, de Gea JMC, Mondéjar JJR. Effects of competitive computer-assisted learning versus conventional teaching methods on the acquisition and retention of knowledge in medical surgical nursing students. Nurse education today. 2011;31(8):866-71.
33. Hale LS, Mirakian EA, Day DB. Online vs. classroom instruction: Student satisfaction and learning outcomes in an undergraduate allied health pharmacology course. Journal of allied health. 2009;38(2):36E-42E.
34. Reime MH, Harris A, Aksnes J, Mikkelsen J. The most successful method in teaching nursing students infection control–E-learning or lecture? Nurse Education Today. 2008;28(7):798-806.
35. Mohamadirizi s, bahadoran p, fahami f. Comparison of e-Learning and booklet on the satisfaction of women in postpartum care. Journal of women, Gynecology and Infertility in Iran. 2014;16(61):1-8.
36. Baghianimoghadam M, Esfandiari R, Nazari M. Comparison of two methods of teaching communication skills to medical staff: presentations and printed materials, on the The satisfaction of their clients in health centers in the Shiraz city. The journal of yazd health. 2012; 11(1):32-40.

Table1. Demographic characteristics of participants.

variables	Levels	Group A N (%)	Group B N (%)	Test Result p-value
Gender	Males Females	9(25.0) 27(75.0)	10(27.8) 26(72.2)	Pearson chi-square test $\chi^2(1)=0.071$ p-value=0.789
Age	<27 27-30 30-33 >=33 Mean ± SD	9(25.0) 11(30.6) 7(19.4) 9(25.0) 29.72 ±0.64	7(19.4) 14(38.9) 14(38.9) 1(2.8) 29.00 ± 0.48	Independent samples t-test t(70)=0.902 p-value=0.370
Education	B.A.Sc M.A.Sc	34(94.4) 2(5.6)	34(94.4) 2(5.6)	Exact fisher test $\chi^2(1)=0.001$ p-value>0.999
Work Experience	<3 3-5 5-7 Mean ± SD	5(13.9) 19(52.8) 14(38.9) 5.11±0.543	3(8.3) 15(41.7) 3(8.3) 4.72 ± 0.461	Independent samples t-test t(70)=0.546 p-value=0.587
CCU Work Experience	<2 2-3 3-4 >=4 Mean ± SD	17(47.2) 9(25.0) 3(8.3) 7(19.4) 2.50±0.377	19(52.8) 8(22.2) 3(8.3) 6(16.7) 2.11±0.335	Independent samples t-test t(70)=0.771 p-value=0.443
Continuing medical education	Yes No	4(11.1) 32(88.9)	2(5.6) 34(94.4)	Exact fisher test $\chi^2(1)=0.727$ p-value=0.674

Table2. Participant's knowledge in written-based and software-based retraining programs during study course.

Nurses' knowledge			Method			Test Statistics p-value
			Package Mean ± SD	**Electronic Mean ± SD**	**Total(time) Mean ± SD**	
Package A Drug Information	**Time**	Before intervention	13.22 ± 0.60	12.85 ± 0.60	13.04 ± 0.42	F_{method} (1,70)=0.364 P_{method}=0.548
		One week after intervention	14.74 ± 0.61	14.07 ± 0.61	14.41 ± 0.43	
		Two Months after intervention	13.48 ± 0.66	13.11 ± 0.66	13.30 ± 0.46	
	Total(method)		13.81 ± 0.55	13.35 ± 0.55		
	Test Statistics p-value		**F_{time}(1.50,105.383)=8.125 P_{time}=0.002**			$F_{time*method}$ (1.50,105.383)=0.115 $P_{time*method}$=0.837
Package B Drug Information	**Time**	Before intervention	13.29 ± 0.63	13.22 ± 0.63		F_{method} (1,70)=0.413 P_{method}=0.523
		One week after intervention	14.63 ± 0.61	15.41 ± 0.61		
		Two Months after intervention	13.70 ± 0.62	14.22 ± 0.62		
	Total(method)					
	Test Statistics p-value		**F_{time} (1.72,120.332)=17.673 P_{time}<0.001**			$F_{time*method}$ (1.72,120.332)=1.439 $P_{time*method}$=0.241