



Comparison of two Traditional Methods and E-Learning Method on the Knowledge and Ability of Health Care Workers in Caring for Patients With Tuberculosis

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Abstract: Background: Identifying, nurturing, and updating the capabilities and capabilities of human resources play a very important role in the survival and progress of the organization in competitive environments, and any neglect of these capabilities as strategic resources and knowledge capitals will definitely lead to Organizations may become victims of the changes and intense competition of the present age; Therefore, this study was conducted with the aim of investigating the effect of e-learning on the development of knowledge and the level of competence of health care workers in tuberculosis.

Methods: In this intervention study, the semi experimental method of pre-test and post-test was used. The statistical population of the study included all the healthcare workers of the Mashhad Health Center in 2017. Of these, 60 people were selected by purposive sampling and randomly divided into control and intervention groups. In order to train the control group, traditional teaching methods were used, and people went to the health center and taught in person. A multimedia educational package was also used to train the intervention group. To evaluate the level of knowledge development and ability of the target group, the checklist of the Ministry of Health was used. Then SPSS version 26 software was used to analyze the statistical data.

Results: The findings showed a significant difference between the level of knowledge and ability of healthcare providers before and after the training course. Also, the results of data analysis showed that there was a significant difference in the post-test method of the control and intervention groups in terms of knowledge

development, which indicated that the development and progress of knowledge through electronic learning in the experimental group was accompanied by a significant increase. Was. In addition, there was a significant difference in the post-test method of control and intervention groups in terms of ability, which indicated that the e-learning method significantly increased the ability of healthcare workers in tuberculosis.

Conclusion: The advantage of this study was that doing this course had little cost and compared to the content presented in the course, it significantly increased the knowledge of healthcare workers, which led to providing more and higher quality services to TB patients. It also led to a significant difference in the ability of the two groups before and after the test. In other words, distance education and e-learning can significantly improve the skill level, learning, and ability of each healthcare provider of TB patients.

Keywords: E-learning, Knowledge development, Capability level, Health care providers, Tuberculosis.

I. Introduction

Today's institutions and organizations, which operate in a knowledge-oriented, competitive and customer-oriented environment, require rapid access to competent, satisfied and committed human resources. In fact, efficient human resources is the main indicator of the superiority of an organization compared to other organizations. On the other hand, identifying, nurturing and updating the capacities, competences and capabilities of the human force has a very decisive role in the survival and progress of the organization in competitive environments, and definitely any neglect of these competences as strategic resources and capital Knowledge causes organizations to become victims of changes and intense competition in the present age (1, 2). Meanwhile, the health care system is one of the most important achievements of the health transformation plan and is also considered the largest sector in most countries, which plays an important socio-economic role (3). Therefore, the growth and development of this institution is conditional on maintaining and managing active and competent human resources on a large and diverse scale in the direction of its growth and development. It should be acknowledged that health team employees form the largest professional group in the health care system. Therefore, considering their prominent role in the health care system and the methods of training them and other health care workers, it is very necessary to empower them in order to maintain their competencies and job standards and spread professional progress (4). In addition, the medical science education department plays a key role in ensuring people's health in the 20th century, and this system also needs to change over time. Therefore, the medical science education department should not only be ready to meet the needs of the society but should also adapt itself to new and up-to-date changes and technologies (5).

On the one hand, it seems that the traditional methods of education, which are currently implemented, alone cannot respond to the rapid movement in the progress of science and knowledge and the continuous change of the needs of societies in the world of informatics. On the other hand, the educational part of medical groups does not end, but should continue during their professional activity.

Therefore, familiarity with new teaching methods is of particular importance. The application of new methods of education is so important that some educational science experts consider the mastery of the aforementioned methods more important than the scientific knowledge and scientific information of a teacher (6, 7, 8). In other words, as an alternative to traditional education, which is relatively efficient and time-consuming, e-learning can be useful in improving knowledge in a large group of health team workers in the health care system (9). Electronic learning is learning and teaching using known and proven computer technologies, especially networks based on Internet technology (10). The advantages of this educational method can be mentioned as lower cost, flexibility, ease of access, universality, and the possibility of self-direction in learning and adapting to individual learning goals (11). This type of education can eliminate all the limitations of traditional educational methods and provide good results along with significant improvements in the field of education. In addition, the use of this new educational method can provide the quality of education as much as traditional education methods or maybe more without spending money and leaving work. In fact, electronic education can complement traditional education (12, 13). In today's era, paying attention to educational issues and especially

electronic education is a mandatory and very important part of medical education and nursing profession (14). E-learning courses can play a significant role in the capacity and occupational and clinical skills of health care workers (15). In addition, due to the advancement of smart ear technologies and the existence of virtual spaces, it seems that electronic education is considered as the most important factor in the development of technology (16). On the other hand, the activists of this field believe that this educational system is not limited to any specialization, level, age and courses.

As a result, the training of health educators is carried out electronically with a new educational method with the ability to convey concepts and content in an easier and wider way with high quality along with text, sound, image and video, and this method is widely used to convey concepts. It becomes (17 - 20). Studies have also been conducted in this field, one can refer to the study of Nizamabadi et al. (21). The results of their study showed that the electronic learning method helps nurses to improve their professional clinical skills due to its high flexibility and access to learning content at any time and any place. On the other hand, Fontaine et al. (11), showed in a research that electronic learning environments play an important role in improving the knowledge, skills and behavior of professional health and professional health students. Also, Ruiz et al. (22), in their study, concluded that the integration of electronic education in medical education can be used as a facilitator of learning and assessment of competence. Therefore, according to the low costs of electronic education, the policy of using this new method in the education of Iran's health care system has been proposed.

In most countries, the health care system is divided into the first, second, and third levels in order to be more efficient and effective, as well as to create justice and access for people (23). As assistants, health care providers help urban family doctors in providing health services. The health centers affiliated to the University of Medical Sciences in Mashhad are among the centers that have taken a step forward in this field and have provided the necessary facilities for remote electronic learning for health care workers. Therefore, considering the potential advantages of the e-learning method, the present study was conducted with the aim of comparing two traditional methods and the e-learning method on the knowledge and ability of health care providers in caring for patients with tuberculosis.

II. Materials and Methods

2.1. Ethics

This study was approved by the Ethics Committee of the Department of Medical Education and Management of Shahid Beheshti University of Medical Sciences with the approved code of ethics IR.SBMU.SME.REC.1397.029.

2.2. Study design and process

The current research was a two-group intervention study of pre-test and post-test type. In this research, the statistical population was 60 health care workers of Mashhad city health center, who were selected by purposive sampling method and were grouped into two control and intervention groups. The most important criteria for entering the study included: health care workers being stationed in Mashhad city health center, declaring their readiness to cooperate in dealing with tuberculosis patients, having a smart phone and installing a messenger program. The most important exclusion criteria included the lack of ability and willingness of health care providers to cooperate. In order to teach in the control group, traditional teaching methods were used, and people went to the health center and taught in person. To train the intervention group, multimedia educational packages were used using multimedia packages (including photos and educational videos, educational clips and e-books) based on the Ministry of Health's booklet on tuberculosis. The assessment of the knowledge and ability of the participants in the study was also done using the questionnaire and the standard checklist of the Ministry of Health in tuberculosis (<https://icdc.behdasht.gov.ir/campaign>) as a pre- and post-test.

2.3. Statistical analysis

To analyze the data, Wilcoxon and Mann-Whitney tests and SPSS version 26 software were used. The significance level was considered smaller than 0.05. The U-Mann-Whitney test was used to compare the pre-test

of the knowledge development and confidence of the health care workers in the intervention and control groups. Also, analysis of covariance test was used to compare the average post-test scores of the intervention and control groups in terms of knowledge development. To investigate the effect of electronic learning on the ability of health care workers in the disease, the Wilcoxon test was used between the pre-test and post-tests of cognition and performance in two groups.

III. Results

In the present study, in the control group, women comprised 67% and men 33%, and in the intervention group, women comprised 57% and men 43% of the group size. In the control group, 20% were single and 80% were married, and in the intervention group, 33% were single and 67% were married. The results showed that the two groups were significant in terms of gender and marital status ($P > 0.05$), but not significant in terms of work experience ($P = 0.035$). In order to compare the knowledge development score between the two groups before, the result of the Mann-Whitney test showed that there was a significant difference between the two groups ($P < 0.001$) (Table 1).

Table 1: Comparison of samples of two groups (control - interventionist) in terms of demographic characteristics (The standard of significance level is $P < 0.001$)

Studied groups		Control Group (percentage)	Intervention Group (%)	p-value
Gender	Female	20(67%)	17(57%)	0.596
	male	10(33)	13(43%)	
Married or Single	Single	6(20%)	10(33%)	0.382
	Married	24(80%)	20(67%)	
Employment history	Less than 5 years	13(43%)	22(74%)	0.035
	More than 5 years	17(57%)	8(26%)	

The results of the analysis of covariance showed that by controlling the pre-test score, there was a significant difference between the average post-test knowledge development score of the two groups ($P < 0.001$), in other words, the intervention group significantly increased the average post-test knowledge development score compared to the control group. increased (Table 2).

Table 2: The results of covariance analysis to compare the average post-test scores of the experimental and control groups in terms of knowledge development

Studied groups		Per- intervention	After the intervention	p-value
Science Development	Control	0.06±3.07	0.22±3.05	p<0.001
	Intervention	0.14±3.23	0.39±4.02	
Ability	Control	0.56±6.1	0.73±6.28	p<0.001
	Intervention	0.48±6.72	0.77±8.07	

IV. Discussion

The amount of development and application of information and communication technology in education is considered the most important indicator of progress, in such a way that virtual education or electronic education is the most important factor in scientific and research leaps. In this regard, the medical education system can create and developing knowledge and empowerment within itself by using electronic learning courses (24). The results of the present study showed that the e-learning method has been able to significantly increase the ability of health care workers in tuberculosis.

A study was conducted by Karim Zadah et al. in 2012, and their research findings indicated that the relationship between the effectiveness of e-learning through the components of educational content, the ability of the instructor to present the material, the quality of information technology, and the possibility of communicating and receiving feedback in empowerment. It was confirmed and based on the regression test, it was emphasized that there is a positive relationship between the components of e-learning and the empowerment of managers (25), and these results were almost in line with the results of the present study.

Nizamabadi et al. (2013) concluded in a research that e-learning helps nurses to improve their professional clinical skills due to its flexibility and access to learning content at any time and any place. The transfer of learned knowledge to the clinical field is very successful (26). The results of the present study also showed that the e-learning method had a significant effect on the development of the knowledge of health care workers in tuberculosis and the amount of this effect was 3.19%. Also, Ruiz et al. (2006) also showed in a research that the use of electronic learning technologies can increase individual learning, increase cooperative learning interactions, and change the role of the instructor.

In another study conducted by Shiri et al. in 1401, with the title of investigating the impact of the e-learning course upon entering the service on the knowledge of health care workers in the field of family health care, the basis of their study method was the design of the e-learning course, based on the stages of the general model of educational design. . The results of the study showed that the average knowledge score of health care workers, after participating in the electronic training course, had a significant increase compared to before participating in the course (27). And there has been an improvement in the knowledge of the health care group in e-learning in dealing with TB patients.

The results of the present study and the conducted studies showed that the integration of electronic education in medical education can be used as a facilitator of learning and evaluation of competence. Therefore, it can be concluded that the performance and learning skills of health care workers play a central and important role in dealing with TB patients. Distance education and electronic learning can significantly improve the skill level, learning and ability of each of the health care workers of TB patients and the results of the research indicated that the implementation of multimedia packages and electronic education in improving the ability of each It has had a positive effect on health care workers. The results showed that the implementation of the multimedia package of the e-learning training course had positive effects on the development of the knowledge of health care workers, and also improved their knowledge level in the field of caring for TB patients.

In the results, it was found that the process and content of e-learning had a positive and important role in informing health care providers and developing and advancing their knowledge. The advantage of this was that doing this e-learning course cost little and compared to the content presented in the course, the amount of knowledge of health care workers had significantly increased, which led to providing more and higher quality services to TB patients. Also, the findings of the research indicated that there was a significant difference in the ability of the two groups of pre-test and post-test health care providers in e-learning in tuberculosis.

In other words, the researchers of the present study concluded that distance education and electronic learning can significantly improve the skill level, learning and ability of each health care provider of TB patients. In the end, one of the strong points of the study can be the improvement of educational quality in the conditions of not needing physical presence along with increasing the quality and attractiveness for most learners, learning in different places and times and using smart tools in educational virtual spaces and also reducing the cost. pointed out. One of the weak points that can be pointed out is that, considering that the electronic learning method has been applied in Iran for several years, but medical science workers have recently focused on this new educational method in recent years.

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