

## Evidence-Based Learning in Occupational Health Management

Seyedeh Negar Assadi<sup>\*,1</sup>

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1.(Corresponding Author)\* Associate Professor, Health Sciences Research Center, Department of Occupational Health Engineering, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran

Email: [assadin@mums.ac.ir](mailto:assadin@mums.ac.ir)

### ABSTRACT

**Objectives:** Occupational health management is an important course for occupational health students. This course will be more beneficial if it is taught with new educational methods. The objective of this study was the introduction of an evidence-based learning method for occupational health management.

**Methods:** This was a semi-experimental study which was conducted using the curriculum of occupational health. This study was done on 102 occupational health students. This course had been taught 2014-2015 with evidence-based learning method for students. In this method, teacher used recent related references, journals and websites about the occupational health management. Tests were administered pre- and post-classes using multiple choice questions and short answers. The results of exams were analysed by SPSS 16 using paired t-tests with statistical significance set a  $p < 0.05$ .

**Results:** The average grade of occupational health management was  $17.54 \pm 1.49$  (Min: 13.25 and Max: 19.50) in the post-test and was  $1.2 \pm 0.3$  (Min: 0 and Max: 1.5) in pre-test ( $p < 0.001$ ). All of the theoretical and applicable lessons were significantly different with  $p < 0.001$ , but in practical lessons was significant with  $p = 0.003$ .

**Conclusion:** According to these results, evidence-based learning was a useful educational method for occupational health management, especially for theoretical lessons.

**Keywords:** Evidence-based learning, Occupational Health, Management

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## Introduction

The use of new educational methods is encouraged. At first, some of these methods were used in medical and general practitioner education [1], but in recent years these methods were adapted for use in other fields, such as health sciences and nursing education. One of these methods is evidence-based learning in health education, which is a sample of evidence-based medical sciences learning. In this method, the teacher and students used recent scientific knowledge; however, in other educational methods, previous references were used. Monroe-Wise A et al. showed that an innovative approach to global health education was new educational methods, such as evidence-based learning [2].

In the field of occupational health, many courses are taught and many of them are theoretical, but some of the lessons can be useful if they are presented in both applied and practical form. One of these courses is occupational health management. This course has many items. If this course presents scientific evidence, and the course will be more useful for students' occupation in the future.

Karimian Z et al. demonstrated the effect of evidence-based learning of a medical course on clinical decision making [3]. Tong A et al. showed the usefulness of evidence-based medicine on radiologists' clinical practice [4].

George KJ et al. determined the situation of evidence-based guidelines for a hospital system [5]. Some studies established the

utility of new educational methods for better teaching and learning, such as evidence-based learning [6–8].

Evidence-based learning is recommended for teaching methods [9] and in one study was used for surgical teaching [10]. However, some studies recommended it for theoretical science and for journal club or other sessions [11, 12].

Another study emphasized the use of evidence-based learning for other situations, such as continuing education for graduated persons [12] and for training professors in the scholarship parts [13]. Students should be introduced to evidence-based learning [14], this method has application in care units and workshops [15, 16]. Evidence-based learning has previously been evaluated in medical, psychiatrics, and orthotics education [17-20].

In this study, the author introduces evidence-based learning for occupational health management, since this course is a prerequisite for many future courses.

The objective is the introduction of evidence-based learning for occupational health management.

## Materials and methods

This study is performed as a semi-experimental study from 2014 to 2015 on 102 occupational health students enrolled in a bachelor's degree at the Health School of Mashhad. The inclusion criterion was that occupational health students be in their entrance year between 2014 and 2015 in the field of occupational health, and exclusion

criteria held that the students needed to be studying in another field or have entered university in other years.

Occupational health management has theoretical and applicable or practical lessons. Theoretical lessons include: definitions, main duties, details of duties, classic methods of management, classification of management, job division, discipline, unity, specialist managers and scientific management. Applied lessons include: strengths and weaknesses, differences, explanations, open systems, international standardization organization rules, shift work, rotations, related disorders and prevention, usefulness and practical.

Step 1: Course plans were written according to curriculum of occupational health by using related references in occupational and industrial management, journals of industrial and occupational managements and scientific websites such as the U.S. National Institute for Occupational Safety and Health in united states (NIOSH), Health Ministry of Iran, the International Labour Organization (ILO) and U.S. Occupational Safety and Health Administration (OSHA).

Step 2: The references of related journals and websites introduced to the students, such as the International Standardization Organization (ISO), health ministry, the Occupational Health and Safety Administration (OSHA), haz-map, the World Health Organization (WHO), and ILO. During evidence-based health education students participated in the classes actively.

Step 3: Each session had a pre-test and a post-test. Twenty sessions were included during one semester. Exams included multiple choice questions and short answers. In each session students discussed the subject being taught.

Examinations of the group were prepared using teachers' opinions for the correction and validity. A pilot study showed a Pearson Correlation of 0.84 for the test-re-test reliability in a sample of occupational health students. These tests were included the theoretical and applicable or practical lessons of occupational health management according to the educational programs.

Step 4: Data were gathered in SPSS version 16 and means, standard deviations, and paired t-tests and not pooled variance were calculated. Statistical significance was set at  $p < 0.05$ .

With regard to research ethics, oral consent was obtained from all participants, whose names were kept confidential.

## Results

In this study 102 students participated. Mean age was  $21.11 \pm 2.01$  years and 45% of the students were male and 55% were women. The average grade of occupational health management was  $17.54 \pm 1.49$  (Min: 13.25 and Max: 19.50) in the post-test and was  $1.2 \pm 0.3$  (Min: 0 and Max: 1.5) in the pre-test, and these were significantly different ( $p < 0.001$ ).

Table 1: Comparison between pre- and post-test of theoretical lessons in occupational health management.(N=51,51)

lesson	Test			
	Pre-test ( $\mu \pm SD$ )	Post-test ( $\mu \pm SD$ )	Paired t-test	p-value
Definition	0	0.80 $\pm$ 0.33	-12.33	<0.001
Main duty	0.005 $\pm$ 0.1	0.95 $\pm$ 0.20	-24.24	<0.001
Details of duty	0.007 $\pm$ 0.1	0.91 $\pm$ 0.24	-19.06	<0.001
Classic method	0.01 $\pm$ 0.2	0.92 $\pm$ 0.23	-20.28	<0.001
Classification	0.01 $\pm$ 0.1	0.96 $\pm$ 0.19	-25.0	<0.001
Job division	0	1 $\pm$ 0.01	-	<0.001
Discipline	0.004 $\pm$ 0.1	0.85 $\pm$ 0.30	-14.09	<0.001
Unity	0	0.71 $\pm$ 0.25	-14.04	<0.001
Managers' specialist	0.003 $\pm$ 0.1	0.94 $\pm$ 0.21	-22.27	<0.001
scientific	0.002 $\pm$ 0.1	0.87 $\pm$ 0.24	-18.02	<0.001

Table 1 shows the comparison of grades in pre-test and post-test for theoretical lessons. The mean of these lessons was  $8.94 \pm 0.99$  (Min: 6.5 and Max: 10.0) in the post test. Table 2 shows the comparison of grades in pre-test and post-test for applied lessons. The mean of these lessons was  $8.05 \pm 0.85$  (Min: 6.25 and Max: 9.75) in the post test. The difference between mean grades of theoretical and applied lessons was significant ( $p = 0.001$ ). All of the theoretical lessons were significant: definitions, main duties, details of duties, classic methods of management, classification of management, job division, discipline, unity, specialist managers and scientific management in theoretical lessons were significant between pre and post tests with  $P < 0.001$ . In applied lessons: strength and weakness, difference, explain, open system, international standardization organization rules, shift work, rotation, related disorders and

prevention were significant between pre and post tests with  $p < 0.001$ , but usefulness and practical methods was significant with  $p = 0.003$ .

## Discussion and Conclusion

According to the results, the average grade was  $16.97 \pm 1.49$  with the evidence-based learning method. In this article the grades after the evidence-based teaching were better than before. Evidence-based learning for health sciences was found to be as useful as in other medical sciences. Other studies have determined the effectiveness of this method for journal clubs, morning reports, continuing education and other theoretical classes [11, 12].

Table 2: Comparison between pre- and post-test of applicable lessons in occupational health management..(N=51,51)

lesson	Test			
	Pre-test ( $\mu \pm SD$ )	Post-test ( $\mu \pm SD$ )	Paired (t-test)	p-value
Strength and weakness	0	0.78 $\pm$ 0.28	-13.91	<0.001
Difference	0.01 $\pm$ 0.1	0.96 $\pm$ 0.19	-25.00	<0.001
Explain	0.005 $\pm$ 0.1	0.83 $\pm$ 0.30	-13.86	<0.001
Open system	0.01 $\pm$ 0.1	0.60 $\pm$ 0.30	-9.97	<0.001
Usefulness or practical method	0.002 $\pm$ 0.1	0.26 $\pm$ 0.41	-3.28	0.003
ISO	0	1 $\pm$ 0.01	-	<0.001
Shift work	0	0.93 $\pm$ 0.24	-19.78	<0.001
Rotation	0.004 $\pm$ 0.1	0.72 $\pm$ 0.37	-9.77	<0.001
Related disorders	0.01 $\pm$ 0.1	1 $\pm$ 0.01	-	<0.001
Prevention	0.006 $\pm$ 0.1	0.94 $\pm$ 0.16	-29.49	<0.001

The grades of theoretical lessons were more than pre- tests. For example the mean grade for classification of management methods was  $0.96 \pm 0.19$  and for main duty of managers was  $0.95 \pm 0.20$ . These results were similar to other studies, but one study showed the other characteristic of this method [10]. Assadi S.N et al. showed the effectiveness of evidence-based learning in health education between three educational methods for a theoretical course [22].

Some of the items in applied or practical lessons were less more than pre-test. For example the mean grade for usefulness of practical management method was  $0.26 \pm 0.41$ , determination of open system was  $0.60 \pm 0.30$  and for rotation of shifts was  $0.72 \pm 0.37$ .

In another study, Assadi S.N. et al. demonstrated the effectiveness of evidence-based learning in a medical class [21].

This article has shown the usefulness of evidence-based medical sciences education for practical lessons.

The average grade of theoretical lessons was significantly higher than that of applied or practical lessons.

In this study, the use of the evidence-based learning in health education was a first for this course.

This study had some limitations. The number of students with entrance years to school and searching in internet was provided with some problems. The researcher helped from two entrance years students for study.

These results of this study suggest that for teaching the occupational health management course, the use of evidence-based health education was effective, especially for theoretical lessons. Additional studies using meta-analysis form for perfect study and literature review are necessary, especially for new educational methods for theoretical and practical lessons.

According to these results, evidence-based health education was a useful educational method, especially for theoretical lessons. The author recommends doing more studies about evidence-based learning in other lessons and in other fields.

### **Conflict of interest statement**

The author declares no conflict of interest.

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