



CODEN (USA): IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.802637>Available online at: <http://www.iajps.com>

Research Article

**DESIGNING, PRODUCING AND EVALUATING OF EDUCATIONAL  
MULTI-MEDIA APPLICATION FOR THE SELF-CARE OF PATIENTS  
WITH TYPE 2 DIABETES**Soleyman Molaei<sup>1</sup>, Meimanat Hosseini<sup>2\*</sup>, Seyed Mohammad Tabatabaei<sup>3</sup>, Mansoureh Zagheri Tafreshi<sup>4</sup><sup>1</sup>Master of Nursing Nursing & Midwifery School, Shahid Beheshti Medical Sciences, Tehran, Iran.<sup>2</sup>Assistant professor, Ph.D, Nursing & Midwifery School, Shahid Beheshti University of Medical Sciences, Tehran, Iran.<sup>3</sup>Msc, Medical informatics department, Faculty of Paramedical science, Shahid Beheshti University of Medical science, Tehran, Iran.<sup>4</sup>Associate Professor, Ph.D in Nursing Management, Nursing & Midwifery School, Shahid Beheshti University of Medical Sciences, Tehran, Iran.**Abstract:**

*Patients with diabetes to improve their care require effective training. Computer-based education is one of the useful strategies and flexible training for patients. The aim of this study was designing, producing and evaluating of educational multi-media application for the self-care of patients with type II diabetes. In this paper using literature reviews and training needs assessment of 10 patients with type II diabetes, and 10 teachers in the field of diabetes educational content was prepared. Multimedia training program was designed and produced with composing the ten principles Mayer multimedia design and studious credible evidence on CD-ROM. Then 36 patients with type II diabetes who were referred to health centers and 30 teachers of the Shahid-Beheshti University of Medical Sciences purposive was selected to complete the relevant researcher made questionnaires, until after the observation and study of the educational program. The results of the final evaluation showed total score of educational program with users questionnaire was 46.6 that compared with the maximum points of total possible score, 55 is favorable. Also final evaluation showed Total Score of educational program with teachers questionnaire was 163.26 that compared with the maximum points of total possible score, 200 is favorable. Educational multi-media application self-care in type diabetes II, with focus on the patient's main problem and, using the design principles of multi-media can facilitate teaching and learning process in patients with type II diabetes.*

**Keywords:** Multi-media Application, Educational, Self-care, Type II diabetes**Corresponding author:****Meimanat Hosseini,**

Assistant professor, PhD,

Nursing &amp; Midwifery School,

Shahid Beheshti University of Medical Sciences,

Tehran, Iran.

E-mail: [meimanathosseini@yahoo.com](mailto:meimanathosseini@yahoo.com); [m\\_hosseini@sbmu.ac.ir](mailto:m_hosseini@sbmu.ac.ir)Tel: [+982188655384](tel:+982188655384)

QR code



Please cite this article in press as Meimanat Hosseini et al, **Designing, Producing and Evaluating of Educational Multi-Media Application for the Self-Care of Patients With Type 2 Diabetes**, *Indo Am. J. P. Sci*, 2017; 4(05).

**INTRODUCTION:**

Diabetes is a serious challenge for the health of the world's population. It is estimated that 347 million individuals are suffering from diabetes all over the world [1], the overall number of people who have diabetes is supposed to increase from 285 million in 2010 to 439 million in 2030 [2]. According to the statistics of Ministry of Health and Medical Education, the incidence rate of diabetes is 3.2 out of each 10 individuals in Iran and based on the report of The World Health Organization, there will be 12 million people suffering from diabetes in 2025 in Iran [2]. Diabetes decreases life expectancy by one third and the prevalence of disability in these people is two or three times more than common individuals in society. Diabetes imposes a cost of 100 billion dollars for the health system of Iran and it is the mortality cause of more than 200 thousand deaths throughout the year [3]. Type II diabetes includes 90-95% of all cases of diabetes; almost, 9 out of 10 patients who get afflicted with diabetes are turned out to have type II diabetes [4]. Given their long infliction periods, chronic diseases such as diabetes usually make the patients and the involved family highly responsible for providing necessary care [5]. Diabetes self-care is defined as a voluntary process to increase general knowledge and learn how to deal with the complicated nature of diabetes [6]. For scientists, self-care activities cover actions which are implemented by the individual to survive, recover, get better, and prevent the incidence of further diseases [7]. Active participation of the patient in treatment process through conducting self-care activities is a key factor in controlling diabetes; thus, patients and their families are responsible for the realization of 95% of the treatment process [8]. Providing necessary instructions for the patient as a useful, effective, and fundamental service is an outstanding right of the patient and, also, the most important responsibility of health care providers, such as nurses [9]. Due to advances in technology and increasing use of electronic resources in people's daily life, educational processes will have no effect unless accompanied with educational technology in the modern world. Instructional programs cause easier implementation of required plans [10]. Recently, providing computer-oriented instruction for the patients in various forms has become more and more common in all areas of medical sciences, such as nutrition, medicine, and nursery and various studies conducted on heart patients, pregnant women, and adolescents have provided positive results, such as increased awareness, self-care, and adherence to diet [9]. Required instructional services are presently provided merely in some limited centers in big cities but a large portion of diabetes patients live in small cities

and rural areas and are too busy to participate in such instructional courses [2]. Therefore, virtual education seems to provide more extensive accessibility for a larger number of patients; given the availability of electronic sources even in the most remote part of the country, educational technology seems to be quite of help in removing self-care education problems. Electronic educational programs can be used when necessary and the user can adjust the pace of education with his individual learning capacity [11]. Some other advantages of computer-oriented education include entertaining the learner, safety of the learner, less costs comparison to real-life events, providing maximum use for the learner, and remote teaching capabilities [12]. Virtual learning is quicker than traditional learning processes and it is supposed to enhance the pace of learning by 50%. Numerous plans, none of which has focused on the significance of self-care services, have been implemented on controlling and dealing with diabetes both in Iran and all over the world. Iran's association of diabetes provides required instruction solely through hard copies, brochures, and pamphlets and there is no software or application designed to replace traditional instructional tools. Given the high incidence rate of diabetes in Iran and all over the world, the motto of Ministry of Health, which emphasized self-care in 2014 and defeating diabetes in 2016, benefits of multi-media teaching, and the lack of comprehensive plans for type II diabetes patients, the present study was conducted in order to design, produce, and evaluate educational programs in the field of diabetes.

**MATERIALS AND METHODS:**

Sampling was performed in two stages in a purposive method. In the first stage, which included educational need assessment, 10 patients suffering from type II diabetes who had referred to treatment center of Shahid-Beheshti University of Medical Sciences and 10 faculty members of the same university and experts in the field of diabetes were chosen. The second stage included assessing designed multi-media educational program and it covered 36 patients suffering from type II diabetes who had referred to treatment center of Shahid-Beheshti University of Medical Sciences and 30 professors and experts in different fields of Endocrinology, Nursery, MS and PhD students, nutritionists, medical informatics, and physical education were selected. The inclusion criteria of the present study for the patients were the following items: passing at least 6 months from the diagnosis of type II diabetes, being able to work with computer on, at least, elementary level, being fluent in Farsi, being under treatment with pills lowering blood sugar and insulin. In case of professors, faculty members, and experts, inclusion criteria were nurses

with at least BS degree, Endocrinologist, nutritionist with, at least, PhD degree, physical educationist with at least BA degree, and Medical Informatics with minimum degree of MA. The exclusion criteria included quitting out of the project prior to its conclusion and not answering 100% of questions. Four questionnaires were used to collect required data: need assessment questionnaire for the production of educational content (for patients), need assessment questionnaire for the production of educational content (for professors and faculty members), initial evaluation questionnaire for assessing produced programs (for patients), and demographic information [2, 7 and 13]. The minimum score of assessment was 11 and the maximum score was 55. Multi-media program assessment questionnaire (for professors and faculty members) included 40 questions with minimum score of 40 and maximum score of 200. The collected data was analyzed using SPSS, version 16 [14, 15].

#### FINDING:

There were 7 males and 3 female patients, with mean age of  $55.8 \pm 7.8$  years, in the need assessment stage; there were also 4 males and 6 female professors, with mean age of  $45.7 \pm 5.3$  years, in the same stage. From the perspective of the patients, their most important self-care instructional need was principles of proper nutrition, physical exercise, and medical treatment; and, from the perspective of professors and experts, the most important self-care instructional needs of the patients were proper nutrition, prevention of disease and its complications, exercise, medication, and blood sugar measuring. According to the findings of need assessment stage, the mean and standard deviation (SD) of the age of 20 males and 16 female patients was  $52.5 \pm 9$ ; mean age and work experience of 5 males and 25 female professors turned out to be  $47.8 \pm 5.1$  and  $22.22 \pm 3.52$ . The final score of patient educational program questionnaire turned out to be 46.6 which, considering the maximum score of 55, was a desired outcome; the final score of professor educational program questionnaire turned out to be 163.26 which, considering the maximum score of 200, was a partly desired outcome.

**Table 1: Evaluation scores given by patients to educational program in assessment stage**

Evaluated characteristic	Possible Maximum Score	Mean $\pm$ SD Evaluation Score
Ease of program setup on PC	5	3.6 $\pm$ 0.82
Simplicity, clarity, and convenience of working with the program	5	4.3 $\pm$ 0.57
Legibility and clarity of written text	5	4.4 $\pm$ 0.50
The appropriateness of offered content	5	4.1 $\pm$ 0.82
High quality of images and films	5	4.3 $\pm$ 0.71
Quality of the sound	5	4.3 $\pm$ 0.76
The attraction of the colors and innovation in designing pages	5	4.1 $\pm$ 0.63
Ease in searching and finding included content	5	4.2 $\pm$ 0.72
High quality of options and menu keys	5	4.4 $\pm$ 0.65
Ease of understanding different parts and sections of the content	5	4.6 $\pm$ 0.76
Usefulness of presented materials	5	4.4 $\pm$ 0.60
<b>Total</b>	<b>55</b>	<b>46.4</b>

**Table 2: Evaluation scores given by professors and experts to educational program in assessment stage.**

Assessment aspect	Number of phrases	Possible maximum score	Mean evaluation score
<b>Mayer Multimedia designing principles</b>	10	50	40.38
<b>Content</b>	7	35	28.5
<b>Setting learning goals</b>	4	20	16.95
<b>Feedback</b>	1	5	3.76
<b>Motivation</b>	3	15	11.73
<b>Educational program presentation</b>	9	45	36.51
<b>Functionality</b>	4	20	16.13
<b>Availability</b>	1	5	4.3
<b>Reusability</b>	1	5	4
<b>Total</b>	40	200	163.26

**DISCUSSION:**

The present study examined self-care and educational needs of type II diabetes patients, because focusing on educational needs of patients is one of the most fundamental requirements of providing effective instructions for them. When the distance between the level of knowledge, skill, respective, and tendency is clearly defined among individuals and groups, their educational needs are properly identified. The basic challenge in the realm of health and hygiene is determining what society truly needs and what can be done to realize this expectation [16]. According to the findings of the present study, the most important self-care instructional needs of patients were principles of proper nutrition, physical exercise, and medical treatment; from the perspective of professors and experts, the most important self-care instructional needs of the patients were proper nutrition, prevention of disease and its complications, exercise, medication, and blood sugar measuring. According to study Shahraki et al, 2013 which was conducted to determine educational needs of diabetes patients, the most important and common requirements of patients turned out to be self-monitoring of blood glucose, taking blood glucose lowering medicine, side effects of medications, proper nutrition, weight management, the importance of daily physical activity education

and its variants, identifying symptoms of lowered or heightened blood sugar level, daily physical activity, daily foot inspection in terms of susceptibility to ulcers, blood pressure and cholesterol control, regular visits with the doctor in order to conduct eye examination and evaluation of renal function [17]. In order to produce educational programs and ensure the effectiveness of these computer-oriented instructions for the patients, there are some practical usage guidance, such as using multi-media properties, taking into account physical characteristics, language skills and literacy level of the patients, and controlling programs by users, recommended [18]. The health status of the individual does not complicate the process of using technology and IT-based instructions [11]. To address any potential concerns about the training schedule convenience and given the characteristics of patients with type II diabetes, such as old age, fatigue, and vision problems, it was tried to simplify and magnify instructions as much as possible. In addition to physical characteristics of patients, several other factors, which were supposed to facilitate, and enhance the efficiency of, these programs, such as environmental and cultural specificities, were considered as much as possible [19]. Therefore, type II diabetes patients had active participation in designing and producing the content

of educational programs. According to study Salehi-Moghadam et al, 2013, which was conducted in order to assess the impact of virtual instruction on the extent of adherence of type II diabetes patients to their diets, the disc delivered to the patients was merely about the knowledge they required concerning appropriate diet and it did not provide any other instructions regarding other aspects of type II diabetes [2]. Testing users is the most important part of the process of evaluating a software or application [20]. According to the results of final user survey, the final score of patient educational program questionnaire turned out to be 46.6 and that of the professors was 163.26, which, both, seemed quite desired and positive. According to the findings of several studies, using computer-based multi-media materials facilitates the process of teaching and learning [21]. In study of Feizollah Zade et al, 2014, which was conducted to assess the impact of computer-based multimedia instruction on care-giving efficacy in hemodialysis patients, Meyer multimedia design principles were used to develop multi-media software; the final results showed that the overall score of the software turned out to be 52.5 which, comparing to maximum possible score of 65, was quite desired and appropriate; also, the final score of professor educational program questionnaire turned out to be 158.8 which, considering maximum possible score of 200, was quite efficient [9]; this is consistent with the findings of the present study. In study of Yousefi et al, 2014, which was conducted to evaluate Multimedia educational and health programs for the prevention and treatment of stiff neck, a mobile training program consisting of images and texts was produced and installed on the mobile phone of the studied subjects; then, subjects filled researcher-made questionnaire the result of the analysis of which showed that subjects confirmed educational objectives of the designed program by giving it a high score [13].

#### CONCLUSION:

Based on the results of the present study, computer-based self-care multimedia type II diabetes programs are quite efficient in enhancing the knowledge of involved parties; thus, designing and producing such programs can be the main strategy in dealing with type II diabetes.

#### ACKNOWLEDGMENT

The present paper is extracted from MA thesis of Soleyman Molaei, kindly guided by Dr. Meimanat Hosseini, with ethical code of SBMU2.REC. 1394.170. Hereby, the attempts, favors, and contributions of those, including professors and faculty members of Shahid Beheshti University of

Medical Sciences, who helped in the completion of the thesis is deeply appreciated.

#### REFERENCES:

1. Ruggiero L, Moadsiri A, Quinn LT, Riley BB, Danielson KK, Monahan C, Bangs VA, Gerber BS. Diabetes Island: preliminary impact of a virtual world self-care educational intervention for African Americans with type 2 diabetes. *JMIR Serious Games*. 2014; 2(2): 10-6.
2. Salehimoghaddam AR, Khosravi-Bonjar A, Karimi-Moonaghi H, Gholami H. An investigation of The Effect of E-learning Education Method on Dietary Regimen in Type 2 Diabetic Patients. *Evidence Based Care* 2013; 3(8): 51-8.
3. Noohi E, Khandan M, Mirzazadeh A. Effective of electronic education on knowledge, attitude and self-care in patient's diabetic type 2 refer to diabetic center of Kerman University of medical science. *Iranian Journal of Nursing Research* 2011 6(22): 73-80.
4. Balk EM, Earley A, Raman G, Avendano EA, Pittas AG, Remington PL. Combined diet and physical activity promotion programs to prevent type 2 diabetes among persons at increased risk: a systematic review for the Community Preventive Services Task Force. *Annals of internal medicine* 2015; 163(6): 437-51.
5. Abrehdari H, Correlation between self-care behaviors and health locus of control in patients with diabetic foot, referred to Taleghani Hospital in 2012. Master's thesis, Shahid-Behshti University of Medical Sciences, 2013.
6. Shrivastava SR, Shrivastava PS, Ramasamy J. Role of self-care in management of diabetes mellitus. *Journal of Diabetes & Metabolic Disorders* 2013; 12(1): 14-21.
7. Vosoghi-Karkazloo N, Abootalebi-Daryasari GH, Farahani B, Mohammadnezhad E, Sajjadi A. The study of self-care agency in patients with diabetes. *Modern Care, Scientific Quarterly of Birjand Nursing and Midwifery Faculty* 2012; 8(4): 197-204.
8. Neta R, Sá D, Silva AR, Silva GR. Adherence to foot self-care in diabetes mellitus patients. *Revista brasileira de enfermagem* 2015; 68(1): 111-16.
9. Feizollah-Zadeh H. The effect produced multimedia-based education program on outcomes of care for patients undergoing hemodialysis. PhD thesis, Shahid-Beheshti University of Medical Sciences and Health Services, 2014.
10. Alkhafaji S, Seriram B. Educational Software Development Life Cycle Stages” International Conference on Business and Information 2012; 11(1): 128-37.
11. Welch G, Garb J, Zagarins S, Lendel I, Gabbay RA. Nurse diabetes case management interventions

and blood glucose control: results of a meta-analysis. *Diabetes research and clinical practice* 2010; 88(1): 1-6.

12. Hosseininasab D, Abdullahzadeh F, Feizullahzadeh H. The Effect of Computer Assisted Instruction and Demonstration on Learning Vital Signs Measurement in nursing Students. *Iranian Journal of Medical Education* 2007; 7 (1): 23-30.

13. Yousefi A. Design and evaluation of educational multimedia software, mobile health, to prevent and treat neck spasms. Master's thesis, Shahid-Beheshti University of Medical Sciences and Health Services, 2014.

14. Havasian MR, Panahi J, Pakzad I, Davoudian A, Jalilian A, Zamanian Azodi M. Study of Inhibitory effect of alcoholic and aqueous extract of *Scrophularia striata* (tashne dari) on *Candida albicans* in vitro. *J of Pejouhesh* 2013; 36(1): 19-23.

15. Panahi J, Havasiyan MR, Gheitasi S, Pakzad I, Jaliliyan A, Hoshmandfar R, Havasiyan M. The in Vitro Inhibitory Effects of the Aqueous Extracts of Summer Onion on *Candida Albicans*. *J of Ilam Uni Med Sci* 2013; 21: 54-9.

16. Gilmore G, Campbell M. *Needs and Capacity Assessment Strategies for Health Education and Health Promotion*, 3rd Edition, Sudbury, Ganes and Bartlett Publishers, 2005.

17. Shahrakivahed A, Haghghi M, Nrouei F, Hamed shahraki S, Heydari M. A Study on the Assessment of Educational Needs of Diabetic Patients. *J Diabetes Nurs* 2013; 1(1): 31-7.

18. Fox MP. A systematic review of the literature reporting on studies that examined the impact of interactive computer-based patient education programs. *Patient Education and Counseling* 2009; 77(1): 6-13.

19. Falvo DR. *Effective Patient Education: A Guide to Increased Adherence*". 4<sup>th</sup> Ed. Sudbury, Jones and Bartlett Publishers, 2011.

20. Madan A and Dubay SK. Usability evaluation methods: a literature review. *International Journal engineering Science and technology* 2012; 4(2): 590-99.

21. Dumrongpakapakorn P, Hopkins K, Sherwood P, Zorn K, Donovan H. Computer-mediated patient education: opportunities and challenges for supporting women with ovarian cancer. *Nursing Clinics of North America* 2009; 44(3): 339-54.