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Original Article

## Distance education and diabetes empowerment: A single-blind randomized control trial

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### ABSTRACT

**Aims:** Diabetes is one of the biggest problems in healthcare systems and kills many people every year. Diabetes management is impossible when only utilizing medication. So, patients must be educated to manage their diabetes. This study aims to assess the effect of education by telephone and short message service on empowering patients with type 2 diabetes (primary outcome).

**Materials and methods:** A single-blind randomized controlled trial was conducted in the Urmia diabetes association in Iran. Sixty six participants with definitive diagnosis of type 2 diabetes entered into the study. Patients with secondary health problems were excluded. Patients were selected by simple random sampling then allocated into intervention (n=33) and control (n=33) groups. The intervention group received an educational text message daily and instructive phone calls three days a week for three months along with usual care. The Diabetes Empowerment Scale (DES) with confirmed validity and reliability was used for collecting data. Data was analyzed using SPSS V6.1. Independent *t*-test, paired *t*-test and chi-square were used to analyze the data.

**Results:** The empowerment of the intervention group compared with the control group significantly improved after three months of distance education ( $p < 0.00$ ,  $EF = 1.16$ ).

**Conclusions:** The study findings show that the distance education has a significant effect on empowering patients with type 2 diabetes. Therefore, using distance education along with other diabetes management intervention is highly effective and should be part of the care in diabetes treatment.

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### 1. Introduction

Diabetes is one of the most common chronic diseases and the greatest health problems in all nations, so that the World Health Organization (WHO) calls it a silent epidemic [1]. Type 2 diabetes is a chronic disease that affects a person's general health and social welfare in different ways [2]. The global prevalence of diabetes was estimated to be 9% in 2014. In recent decades, the prevalence of diabetes has been rising dramatically worldwide, and especially accelerated in low- and middle-income countries [3]. Today, 382 million people suffer from diabetes worldwide, or 8.3% of the adult population, and estimated that this number will increase up to 592 million people by 2035. This equates to almost three new cases every 10 s [4]. In Iran, a national study of Survey of Risk Factors for non-communicable diseases reported the prevalence of diabetes to

be 7.7% in 2008 [5]. Zareban to quote from the World Health Organization estimates that the number of patients with diabetes will reach to more than six million in Iran in 2030 [6]. Diabetes leads to cardiovascular, cerebrovascular and peripheral vascular disease, retinopathy, neuropathy, nephropathy, diabetic foot, amputation and depression [7]. It was estimated 5.1 million people died because of diabetes related complications in 2013, or one death every 6 s [4], and diabetes deaths will double between 2005 and 2030 [8]. Diabetes is the fourth leading cause of death worldwide [4] and will be the 7th leading cause of death in 2030 [9]. Diabetes was the 7th leading cause of death in Iran, killing 8.8 thousand people in 2012 [3].

Diabetes is incurable, but it can be controlled [10]. Frequent hospitalization and poor quality of life in patients with diabetes are the consequences of inappropriate management of diabetes [11]. Poor diabetes control leads to high blood sugar levels in the long term which has a strong correlation with developing chronic complications and cardiovascular disease. These complications are also associated with high health care costs [1]. Before the discovery

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of insulin in 1921, diabetes Control was to avoid early death and coma. Now, it is not only keeping blood sugar levels in the normal range, but other parameters such as blood lipids and blood pressure should also be kept in the normal range [10]. Successful control and achieving treatment goals are required to empower patients with diabetes [12]. Empowerment means activating the process through which individuals or communities take control of their lives and environment [13]. Empowering patients in health care means promoting their self-care to maximize the individuals potential for wellness and personal health by educating, researching information about the disease and being an active participant in treatment decisions [14]. Empowerment enables people to decide about the options provided by doctors [1]. Besides patient's education, it seems essential to conduct a follow-up program to improve their knowledge, performance and attitude [15]. Follow up is possible by visiting the client at home or in the clinic periodically. Considering the high prevalence of diabetes and need for long-term follow up in these patients, the follow-up method should be affordable and applicable to a large number of clients [11].

Nowadays, using remote telehealth programs enables nurses to perform interventions such as monitoring, education, data collecting, nursing care, and pain management [7] Tele-nursing provides care by using a communications device such as video, internet and telephone. Telephone is one of the most popular and available devices in society, and is used regularly [15]. The study shows that distance education by equipment such as telephone, short message service and the Internet has a significant effect on controlling diabetes, adherence to physical activities, weight loss, improving lifestyle, reducing glycosylated hemoglobin, increasing HDL, reducing LDL, increasing diabetes knowledge and promoting self-care and self-management in patients with diabetes [16–27]. Providing care by telephone not only is effective in reducing costs and facilitating access to care, but also improves the relationship between patients and care providers and removes barriers related to place and time [28]. So, considering the need for an accessible health care system and promoting the empowerment of patients with diabetes, it seems essential to conduct studies and investigate factors affecting self-empowerment. The present study is designed to investigate the effect of distance education by telephone and short message service on empowering patients with type 2 diabetes who were referred to the Urmia Diabetes Association.

## 2. Materials and methods

This is a single-blind randomized control trial with parallel design conducted on patients with type 2 diabetes referred to the Urmia Diabetes Association. After obtaining permission from the ethics committee (umsu.rec.1392.167), the researcher referred to the Urmia Diabetes Association and performed necessary coordination with the Association's authorities to collect data. The inclusion criteria were as follows: [1] The initial agreement of patients for participating in the study and signing a written consent form [2] Confirmation of the patient's diabetes by a specialist [3] patient's ability to read and write [4] patient's access to telephone and short message service. Patients with secondary health problems such as mental illness, high blood pressure, and chronic heart, lung or kidney disease were excluded. Based on previous studies,  $\alpha=0.05$  and 80% powers, the sample size was calculated to be 56 patients by using G-Power. Considering 20% attrition rate, 66 patients entered the study [28]. For sampling, first a sampling framework provided for eligible patients who were referred to the Urmia diabetes association, then 66 participants were selected from the random number table using simple random sampling. Participants were then allocated to intervention ( $n=33$ ) and control ( $n=33$ ) groups, randomly. (Fig. 1). The researchers held

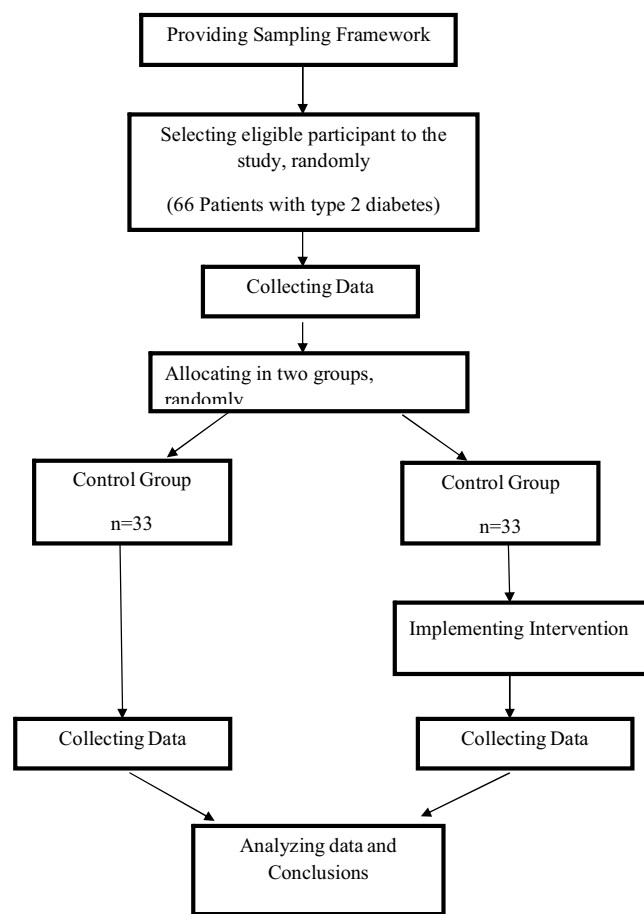


Fig. 1. Consort flow diagram.

an orientation session to explain the purpose of the study to the patients and have them sign a written consent form. An education message was sent daily and also, the necessary education given over the phone three times a week for three months for patients in the intervention group. Their possible questions were answered during the intervention period. The control group received only their usual care during the study. No harm or disadvantage was reported in this study. The content of short messages and phone calls has been set in an informative and respectful manner after consulting with an endocrinologist, psychologist, nutritionist and public health nursing specialist.

A two-part questionnaire was used for collecting data; the first part was for collecting demographic information that was completed during the orientation session. The second part was the Diabetes Empowerment Scale (DES); a standardized tool that has been designed to assess self-empowerment in patients with diabetes. It was completed in the orientation session and after the intervention. This tool has 28 items that assess patient empowerment in three areas; items 18 and 20 to 27 related to managing the psychosocial aspects of diabetes (9 items), items from 1 to 4, 15 to 17, 19 and 28 related to assessing dissatisfaction and readiness to change (9 items) and items 5 through 14 for the setting and achieving diabetes goals (10 items). A five-point Likert is used for scoring the tool, an item checked "strongly agree" receives 5 points; and "strongly disagree" receives 1 point. The empowerment score range varies from 28 to 140 and a higher score means greater empowerment [29]. This is a standard tool that its validity and reliability have been confirmed in the several studies [30,31]. In this study, the English language expert opinions were used to determine the validity of the translation and content validity has

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