



ARAŞTIRMA / RESEARCH

Effect of education on rational drug use and health literacy in people with diabetes mellitus

Diyabetli bireylerde akılcı ilaç kullanımı ve sağlık okuryazarlığı üzerine uygulanan eğitimin etkisi

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Abstract

Purpose: The aim of this study is to evaluate the effect of education on rational drug use and health literacy in people with diabetes mellitus.

Materials and Methods: This pre-test and post-test control group interventional study was conducted between 24 January and 25 July 2020 in Zonguldak Diabetes Association in Turkey. The universe of the study consists of 238 diabetic people registered to the association, and the sample group consists of 154 diabetic people who were registered members of the association who had inadequate and problematic-limited health literacy according to the data collected previously and other sample criteria. Groups of 4-6 people created from the intervention group were applied face-to-face by the researcher with a power point presentations, an educational program that included basic knowledge of diabetes, rational knowledge of drug use and knowledge of health literacy. Data from the study were collected using the Rational Drug Use Scale, the Turkish Health Literacy Scale and Diagnostic Form. Intervention and control groups were established by randomization method regardless of the evaluation results. After three months, assessments of groups were repeated.

Results: In the evaluation of the intervention group in the third month after the education, statistically significant changes were determined in Rational Drug Use Scale score and Turkish Health Literacy Scale score.

Conclusion: It was found that providing group-based education on general diabetes knowledge, rational drug use and health literacy to people with diabetes was effective in increasing rational drug use and health literacy level.

Keywords: : Diabetes mellitus, group education, rational drug use, health literacy

Öz

Amaç: Bu çalışmanın amacı, diyabetli bireylerde akılcı ilaç kullanımı ve sağlık okuryazarlığı üzerine uygulanan eğitimin etkisinin değerlendirilmesidir.

Gereç ve Yöntem: Ön test son test kontrol gruplu deneysel tasarım olan bu çalışma, 24 Ocak-25 Temmuz tarihleri arasında Zonguldak Diyabet Derneği'nde yapılmıştır. Çalışmanın evrenini derneğe kayıtlı 238 diyabetli birey oluşturmada olup, örneklem grubunu ise derneğe kayıtlı üyelerden daha önce toplanan verilere göre yetersiz ve sorunlu-sınırlı sağlık okuryazarlığı ile diğer örneklem kriterlerine sahip 154 diyabetik birey oluşturmaktadır. Çalışmanın verileri Akılcı İlaç Kullanım Ölçeği, Türkiye Sağlık Okuryazarlığı Ölçeği ve Tanılama Formu ile toplanmıştır. Değerlendirme sonuçlarına bakılmaksızın randomizasyon yöntemi ile deney ve kontrol grupları oluşturulmuştur. Deney grubundan oluşturulan 4-6 kişilik gruplara araştırmacı tarafından temel diyabet bilgisi, akılcı ilaç kullanımı bilgisi ve sağlık okuryazarlığı bilgisini içeren eğitim programı power point sunular ile yüz yüze olarak uygulanmıştır. Üç ay sonra grupların bütün değerlendirmeleri tekrarlanmıştır.

Bulgular: Eğitim sonrası üçüncü ayda yapılan değerlendirmede Akılcı İlaç Kullanımı Ölçeği ve Türkiye Sağlık Okuryazarlığı Ölçek puanlarında istatistik olarak anlamlı değişim olduğu belirlenmiştir.

Sonuç: Diyabetli bireylere uygulanan temel diyabet bilgisi, akılcı ilaç kullanımı ve sağlık okuryazarlığı ile ilgili grup tabanlı eğitimin, bireylerin akılcı ilaç kullanımı ile sağlık okuryazarlığı seviyelerinin artırılmasında etkili olduğu bulunmuştur.

Anahtar kelimeler: Diyabet, grup eğitimi, akılcı ilaç kullanımı, sağlık okuryazarlığı.

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INTRODUCTION

Diabetes Mellitus (DM) is a non-infectious chronic epidemic disease that develops as a result of insulin deficiency or inefficiency and is accompanied by acute and chronic complications¹. People with diabetes, whose number is increasing day by day, must have sufficient information about disease management in order to sustain their lives in a healthy and problem-free way^{1,2}. For this reason, it has been reported that people with diabetes are constantly educated on the basic issues they may need and this education is the vital part of treatment. However, it has been determined that less than half of people with diabetes who have access to diabetes education programs may have problems, such as drug use¹. People with diabetes who have to use drugs constantly need to take their medications with attention to regular and rational drug use principles². Rational Drug Use (RDU) has been defined by the World Health Organization (WHO) as "a set of rules that enable patients to take medications in accordance with their clinical needs, at appropriate doses and at the lowest cost to their personal needs, and to the community." With rational drug use, there is a decrease in drug side effects, mortality and morbidity rates, and treatment costs³.

The increase in the number and variety of drugs in recent years has also revealed irrational drug use problems. This is one of the most basic public health problems in the World as many patients may easily access to the drug^{4,7}. Irrational drug use includes applications such as stopping medications or changing doses, not using drugs at the right time^{3,8,9} or using non-prescription drugs in treatment before the recommended time without consulting a physician¹⁰. With these drug use problems/issues, such consequences include increased morbidity and mortality due to failure in treatment, developing drug side effects, developing resistance to drugs, recurrence of diseases, decreased compliance with treatment with non-prescription drugs and increased treatment cost¹¹⁻¹². To prevent these serious problems, it is reported that providing the education about rational drug use and regular follow-up can be beneficial in disease management¹³.

RDU is related to both individuals' socio-cultural and economic background and level of education and health literacy. Health Literacy is defined as "the ability of an individual to access, understand and use health information for protection and maintenance

of health"¹⁴. With the prolongation of human life, the increase of chronic diseases and the changes in health services for them, the importance of health literacy has gradually increased. Especially in chronic diseases such as diabetes, people should have sufficient health literacy to understand the instructions given by health professionals about the disease and to manage their disease effectively. It has been determined that health literacy is directly related to providing adequate information about the disease, ensuring correct use of services, regulating metabolic control, increasing regular drug use and compliance to treatment. For these reasons, both rational drug use and health literacy should be considered^{3,15,16}. It has been stated that education and interventions to increase rational drug use and health literacy are necessary in disease management¹⁷. In addition, since the level of health literacy that people have can be changed and improved, education and knowledge about health literacy are more important, and when it is developed, it will directly affect the health outcomes of people¹⁸. With these reasons, the aim of this study is to evaluate the effect of education on rational drug use and health literacy in people with DM.

MATERIALS AND METHODS

This pre-test and post-test control group interventional study was conducted between 24 January and 25 July 2020 in Zonguldak Diabetes Association in Turkey. The universe of the study consists of 238 diabetic people registered to the association, and the sample group consists of 154 diabetic people who were registered members of the association who had inadequate and problematic-limited health literacy according to the data collected previously and other sample criteria. For one-way analysis of variance, medium effect size, $\alpha=0.05$ and 80% power for each group was considered to be appropriate for 30 participants. The sample size was calculated by power analysis (G*Power 3.1.9.2). Similar studies conducted before to calculate the effect size were taken as examples^{19,20,21}. As a result, intervention (n:30) and control (n:30) groups were created by a statistician using the block randomization method. There was no loss from the groups during the study. All participants stayed in study for three months.

The study included people who had been diagnosed with DM, had inadequate or problem-limited health literacy, didn't have visual or hearing problems or cognitive and psychiatric problems, who could read

and write in Turkish and volunteered to participate in the study.

Ethical approval was obtained from Human Research Ethics Committee of Zonguldak Bulent Ecevit University (date and approval no: 22.01.2020/723). All participants signed informed consent prior to their participation. In order for the study to be conducted in Zonguldak Diabetes Association, written permission was obtained from the president of the association

Measures

The study data were collected from people with DM by face-to-face interview method. Data collection tools are Diagnostic Form, Rational Drug Use Scale (RDUS) and Turkish Health Literacy Scale (THLS-32).

Diagnostic form

This form included questions about patients' age, sex, education, marital status, working status, diabetes duration, drug use, regularly doctor check-up.

RDUS

This scale was developed by Demirtaş et al. and consisted of 21 questions²². Cronbach's alfa level of the scale was 0.789. The answers given to the scale are: Yes; 2 points, I don't know; 1 point, No; 0 points. As scores from the scale increase, the level of knowledge of rational drug use increases. The estimated value for the scale was 34 points. As a result of the use of the scale in this study, Cronh's alpha value was found to be 0.88.

THLS-32

THLS-32 was developed by a Turkish consortium (2016) consisting of academicians and specialists from the Turkish Ministry of Health. Its conceptual framework was based on The European Health Literacy Survey Questionnaire (Q47). Cronhbach's alfa level of the scale was 0.927.

It is a 4 point likert type questionnaire with responses ranging from very easy (1) to very difficult (4). The lowest score is 32 and the highest is 128. Total scores are standardized to be in between 0 and 50. Four levels of health literacy was defined as; 0-25 for "inadequate", >25-33 for "problematic", >33-42 for "sufficient" and >42-50 for "excellent" as in the European Survey²³. As a result of the use of the scale in this study, Cronh's alpha value was found to be 0.92.

Interventions

At the beginning of the study of all the participants scales evaluation were performed. Then, intervention and control groups were created regardless of the scales evaluation. Group based education program was applied to the intervention group. The education program, which were given to people with DM in intervention group, consisted of general information on diabetes (such as nutrition, drug use and complications)^{1,2,24}, rational drug use²⁵⁻²⁷ and health literacy²⁸⁻³².

The content of the education was created similar to the standard subjects and education determined by the Ministry of Health and related studies. The researcher provided the education in the Zonguldak Diabetes Association education room to the groups with four to six participants in 45-60 minutes in one session. This education used power point presentations and face to face interactions. Group education is reported as an effective method for recognising problems and sharing appropriate solutions with group members³³. The duration of the study was determined as three months, as it was reported that three months was enough for a behavior to become a habit³⁴. Intervention and control groups were invited to the diabetes association for third month evaluations on different days.

Due to the Covid 19 pandemic that emerged during the study process, the third month evaluation data of the groups were collected more carefully according to the social distance rules, with one person in the interview. The control group did not receive any education during the study. The researcher (she was also educator) attended to Diabetes Patient School's educations. She also lectured on health literacy in public health and wrote a book chapter. In addition to these, she received training on adult education. In this study, group education was independent variable, and scales assessments were dependent variables.

Statistical analysis

Statistical analysis of the data obtained from the study was performed using the IBM SPSS statistics for Windows, version 19.0 (IBM Corp., Armonk, NY, USA). The categorical variables in the study were shown with frequency and percentage; continuous variables with mean and standard deviation.

The differences between groups in terms of categorical variables were evaluated by Chi-Square

test. Normality distribution of continuous data was analysed with the Kolmogorov-Smirnov test. According to the normality results, the differences of the groups over time were evaluated using the Paired Samples t-test. Also, Independent Samples t-test was used to compare the difference between the study groups. In all statistical analysis in the study, p values less than 0.05 were accepted as statistically significant at a 95% confidence interval.

RESULTS

Participants of the study, 66.7 % of the intervention group and 60.0 % of the control group were male and the majority of them stated their marital status as married. The average age of the intervention group is 63.93 ± 5.52 and the average age of the control group is 62.06 ± 5.90 . Some of the demographic of the groups were similar and there was no statistically significant difference between the two groups ($p > 0.05$) (Table 1). In the evaluation of the groups at the baseline and third months, there was no

significant difference in the control group in terms of the total RDUS score ($p = 0.396$), while there was a statistically significant difference in the intervention group ($p < 0.001$). Moreover, a significant difference was determined between the groups in the evaluation of the third month after the education ($p < 0.001$) (Table 2).

A statistically significant difference in THLS-32 score was found in the baseline and third month evaluation of the intervention group after education ($p < 0.001$). Moreover, a significant difference was determined between the groups in the evaluation of the third month after the education ($p < 0.001$) (Table 3) A statistically significant difference in regular doctor check-up ($p < 0.001$) and using non-prescription drugs ($p < 0.001$) were found in the baseline and third month evaluation of the intervention group after the education. Moreover, a significant difference in regular doctor check-up ($p = 0.002$) and using non-prescription drugs ($p = 0.003$) were found between the groups in the evaluation of the third month after the education (Table 4).

Table 1. Demographic characteristics of intervention and control groups

Socio-demographic characteristics		Intervention (n=30)		Control (n=30)		p
		n	%	n	%	
Age (years) (mean \pm SD)		63.93 ± 5.52		62.06 ± 5.90		^a t=1.265 p=0.211
Gender	Female	10	33.3	12	40	^b X ² =0.287 [*] p=0.592
	Male	20	66.7	18	60	
Marital status	Married	18	60	19	63.3	^b X ² =1.223 [*] p=0.543
	Single	2	6.7	4	13.3	
	Widow	10	33.3	7	23.3	
Education status	Primary school	8	26.7	3	10	^b X ² =4.212 [*] p=0.239
	Middle school	9	30	7	23.3	
	High school	13	43.3	20	66.7	
Working status	No	19	63.3	17	56.7	^b X ² =0.278 [*] p=0.598
	Yes	11	36.7	13	43.4	
Diabetes duration (years)	<5 years	8	26.7	6	20	^b X ² =1.071 [*] p=0.585
	6-10 years	14	46.7	18	60	
	11-15 years	8	26.7	6	20	

^aIndependent samples t- test, ^bChi-Square test, ^{*}p<0.05.

Table 2. Evaluation of RDUS for intervention and control groups

	Groups	Baseline mean \pm SD	3rd month mean \pm SD	Difference
RDUS	Intervention	27.85 ± 3.29	38.57 ± 1.57	^b t=-15.708 [*] p<0.001 ^b t=-0.779 [*] p=0.396
	Control	29.32 ± 3.10	29.46 ± 3.29	
	Difference	^a t=-1.711 [*] p=0.093	^a t=13.201 [*] p<0.001	

^aIndependent samples t- test, ^bPaired samples t-test, ^{*}p<0.05.

Table 3. Evaluation of THLS-32 for intervention and control groups

	Groups	Baseline mean \pm SD	3rd month mean \pm SD	Difference
THLS-32	Intervention	18.73 \pm 6.84	37.18 \pm 4.01	^b t=-26.045 *p<0.001
	Control	21.46 \pm 6.09	21.74 \pm 5.93	^b t=-3.808 *p<0.001
	Difference	^a t=-1.579 *p=0.120	^a t=11.400 *p<0.001	

^aIndependent samples t-test, ^bPaired samples t-test, *p<0.05.

Table 4. Evaluation of health-related behaviors for intervention and control groups

	Groups	Baseline		3rd month		Difference
		Yes (n-%)	No (n-%)	Yes (n-%)	No (n-%)	
Regular doctor check-up	Intervention	16-53.3	14-46.7	22 - 73.3	8 - 26.7	^a t=12.468 *p<0.001
	Control	18-60.0	12-40.0	18 - 60.0	12 - 40.0	^a t=25.978 *p=0.357
	Difference	^a t=1.271 *p=0.602		^a t=13.268 *p=0.002		
Using regular medication	Intervention	21-70.0	9-30.0	26 - 86.7	4 - 13.3	^a t=1.002 *p=0.317
	Control	14-46.7	16-53.3	23 - 76.7	7 - 23.3	^a t=-1.779 *p=0.296
	Difference	^a t=0.800 *p=0.371		^a t=1.002 *p=0.317		
Using non-prescription drugs	Intervention	17-56.7	13-43.3	5 - 16.7	25 - 83.3	^a t=8.864 *p<0.001
	Control	16-53.3	14-46.7	16 - 53.3	14 - 46.7	^a t=-0.679 *p=0.198
	Difference	^a t=0.067 *p=0.795		^a t=8.664 *p=0.003		

^aChi-Square test, *p<0.05.

DISCUSSION

Today, the involvement of the patient is increasingly important for successful disease management in health services. In chronic diseases such as diabetes, what the disease process is largely dependent on the adaptation of the individual, it is very important for patients to understand and apply health-related issues. In this context, diabetic people whose prevalence is increasing all over the world and Turkey are expected to know, understand and follow the treatment and care processes in diabetes. In other words diabetic people are expected to take an active role in disease management^{30,35}. To do this, these people should receive diabetes education by healthcare professionals in the areas they need^{1,2}. With diabetes education, raising awareness about the disease can increase individuals' knowledge on this issue¹. As a result of a study, it has been determined that if the people with diabetes are not educated

about the disease, the major complications that may occur are four times higher³³. It has been found that people with DM who receive the education about disease management, mostly know and understand the treatment and care processes, and their attitudes towards the disease, the level of compliance with the treatment, disease management, and regular drug use habits are better³⁶.

People with DM have to use many medications for life to control their disease. For this reason, they must take the drugs with rational drug use principles. In a study, it was determined that people with diabetes had an error rate of 64.7% regarding drug use and this rate was reported to be quite high³⁷. In this study on rational drug use in people with diabetes, the RDU scale score was found to be moderate in both the intervention and control groups at the beginning, and it was observed that the RDUS score of the intervention group increased significantly after the education. This increase, which is one of the primary

results expected from the study, shows that the education given is effective in people with DM. In the literature, no scale-based research on rational drug use was found in people with DM. For this reason, the medication adherence levels of the patients after the diabetes education were examined in the studies conducted.

After the diabetes self-management education in people with DM, there were significant improvements in the medication adherence levels³⁸. As a result of a randomized controlled study conducted with people with DM, Aliha et al. reported that after the group education applied to the intervention group, regular drug use and medication adherence increased compared to the control group³⁹. In a similar study, it was stated that diabetes education was very effective in improving medication adherence⁴⁰. In addition to the recommendation of a physician who is one of the drug use errors, the use of non-prescription drugs can both disrupt the effectiveness of the drugs that must be used in relation to the disease and endanger life due to the side effects that may occur¹⁰. Non-prescription drug use, which was 56.7% in the pre-education intervention group applied in this study, decreased to 16.7% after education and this result was found to be statistically significant.

It is expected that the use of drugs will increase more in the coming years with the gradual aging of the societies and the increase of chronic diseases. This increase in drug use compels people to increase their health literacy level i.e. while using medicine correctly and improving their decision making skills. Therefore, both RUD and health literacy should be taken into account as it and plays an important role in developing relevant policies. Health literacy includes the basic skills to obtain, interpret and understand the essential health information and services that improve the individual' well-being⁴¹. Health literacy in people with DM is considered as an important indicator for controlling people's blood glucose, medication adherence, self-management of the disease. It has been reported that people with DM should receive education on the subject to have adequate health literacy⁴². In this study, while the participants with diabetes in both groups initially had inadequate or problem-limited health literacy level, it was determined that the intervention group reached the sufficient health literacy level with 37.18 ± 4.01 points after the education. This score increase in the intervention group was found to be statistically

significant. This result shows that the increase of health literacy level which another primary result expected from the study after the education.

As a result of a cross-sectional study by Williams et al., it was determined that one of the main problems of the patients was the inability to understand instructions drugs used⁴³. The results of this study show that adequate health literacy is very important for the correct use of drugs. As a result of a meta-analysis study by Marciano et al.⁴², consisting of 61 studies examining the role of health literacy level in DM, health literacy level was reported to be positively effective in maintaining glycemic control in diabetes, increasing diabetes-related knowledge, self-care and disease management. As a result of a study on the medication adherence of health literacy of people with type 2 diabetes, it was stated that as the health literacy level increases, the level of regular drug use and medication adherence of people increases significantly⁴⁴. Similar studies have also reported that people with inadequate health literacy are more likely to make mistakes with drug use^{45,46}. In the literature, there aren't studies evaluating the effect of education given to people with diabetes on health literacy.

The limitation of the study is that the results are not generalizable to all diabetic people since they are performed with a limited number of diabetic people. In addition, the lack of Turkish or foreign literature similar to the research subject has restricted the discussion of the research findings.

This is the first study to evaluate the effect of the group education program on rational drug use and health literacy in people with DM in Turkey. The findings of this study contribute to the increase of the literature on rational drug use and health literacy of people with DM. According to the results of this study, it was found that providing group-based education on general diabetes knowledge, rational drug use and health literacy given to people with diabetes was effective in increasing rational drug use and health literacy level. In primary care institutions, associations or diabetes schools, people with diabetes are recommended to receive education on rational drug use and general issues related to diabetes using educational materials prepared according to their health literacy levels.

Yazar Katkıları: Çalışma konsepti/Tasarımı: TAG; Veri toplama: TAG; Veri analizi ve yorumlama: TAG; Yazı taslağı: TAG; İçeriğin eleştirel incelenmesi: TAG; Son onay ve sorumluluk: TAG; Teknik ve malzeme desteği: TAG; Süpervizyon: TAG; Fon sağlama (mevcut ise): yok.

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