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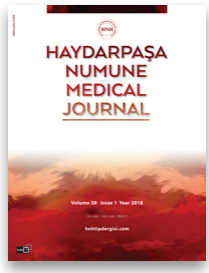

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ORIGINAL ARTICLE

Rational Drug Use in Type 2 Diabetic Patients Who Applied to the Family Medicine Diabetes Outpatient Clinic

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Abstract

Introduction: Diabetes is a widespread chronic disease in society that requires continuous medication treatment and monitoring, and it leads to productivity loss and premature deaths. Rational drug use is of great importance in diabetic patients. This study was conducted to determine the level of rational drug use knowledge among type 2 diabetes patients and the factors influencing it.

Methods: This study is a cross-sectional survey. A total of 234 patients with type 2 diabetes who completed the questionnaires were randomly sampled. A Participant Information Collection Form, which included sociodemographic characteristics, accompanying chronic diseases in diabetes, medications used in diabetes treatment, HbA1c level in the last three months, and body mass index information, as well as the Rational Drug Use Scale, were administered to the participants through face-to-face interviews. The patients were categorized into two groups: those utilizing rational medications and those who were not. Subsequently, a logistic regression analysis was executed to determine the factors predicting rational medication usage within the established model. SPSS 22.0 software was used for statistical analysis and calculations.

Results: The mean score of the Rational Drug Use Scale for patients was found to be 34.9. It was found that 59.8% of the participants had knowledge of rational drug use. Factors affecting knowledge of rational drug use were gender, education level, and income level; being female and having a higher education level and income level significantly predicted the scale score of rational drug use knowledge.

Discussion and Conclusion: The study found that 40% of patients with diabetes mellitus did not have knowledge of rational drug use. It would be appropriate to provide more information to diabetic patients and physicians regarding rational drug use.

Keywords: Antidiabetic drugs; Diabetes mellitus type 2; Utilization review.

According to the World Health Organization (WHO), more than half of the drugs prescribed, distributed, or sold are done so inappropriately, and half of the patients take their medications in an incorrect manner[1]. Rational drug use, as defined by the WHO, encompasses the appropriate selection, indication, dosage, duration, and cost of medication based on clinical need[1].

Non-Rational Drug Use (NRDU) leads to the development of resistance to certain drugs, decreased treatment adherence by patients, drug interactions, recurrence or prolongation of diseases, increased frequency of adverse events, and higher treatment costs[2]. It has been shown that diabetic patients use an average of 2.1 diabetes medications per day[3], making rational drug use crucial

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in the population of diabetic patients who require regular medication use.

Diabetes, like NRDU, is a major health problem, with approximately half a billion people worldwide being affected by it[4]. It is prevalent in all populations and regions, including rural areas in low- and middle-income countries[4]. Diabetes increases medical expenses, causes loss of productivity and premature death, and imposes a significant burden on society[5]. Type 2 diabetes is a significant health issue in our country, as well as globally[6,7].

Patient involvement in the diagnosis, determination of treatment goals, and selection of the most appropriate treatment are essential for the rational prescription of medications[8]. Having knowledge of rational drug use among diabetic patients is important in contributing to the selection of appropriate treatment and rational prescription of medications.

Irrational drug use and type 2 diabetes are important health problems both in the world and in our country, and the point where these two meet makes it even more critical. Studies on rational drug use have shown that rational drug use knowledge is inadequate in individuals with chronic diseases[9,10]. In our country, the knowledge level of diabetic patients regarding rational drug use is inadequate, and there is a need for further research in this area[11]. For these reasons, our aim was to measure the level of knowledge regarding rational drug use among patients with type 2 diabetes and examine the factors influencing it.

Materials and Methods

This study is cross-sectional research conducted between March 15, 2021, and June 15, 2021, at the Diabetes Clinic of the Education and Research Hospital. An average of 200 type 2 diabetes patients per month, 600 in three months, applies to the Diabetes Outpatient Clinic. A total of 600 patients aged 18 years and above, with type 2 diabetes, who presented to the clinic during the study period and who did not have any conditions that could affect their ability to answer the study questions were included in the study using the simple random sampling method. Those who did not volunteer to participate in the study, those with clinically detected mental status disorders, those who could not read or write Turkish, those without type 2 diabetes, those who filled out the questionnaires and scales incompletely, and pregnant women were not included in the study. The study population consisted of 600 patients, and the sample size was calculated using the simple random sampling method from the study population. At a 95% confidence level and a 5% confidence interval, the sample size was calculated as 234. The data of 234 patients were included in the analysis. Prior to the study, permission was obtained from the Clinical Research Ethics Committee of the Education and Research Hospital (decision no: 2021/53, date: 15.02.2021) and the hospital management.

This research was conducted in accordance with the Helsinki Declaration, Good Clinical Practice principles, and the guidelines prepared by the STROBE (The Strengthening the Reporting of Observational Studies in Epidemiology) group.

Data were collected through face-to-face interviews using a questionnaire form. The first part of the questionnaire form included a data collection form in which participants' sociodemographic characteristics, body mass index (BMI), duration of diabetes, HbA1c level in the past 3 months, accompanying chronic diseases, and antidiabetic medications used were queried. The second part of the questionnaire form utilized the Rational Drug Use Scale (RDUS) from the Turkish Measurement Tools Index to evaluate participants' knowledge of rational drug use. The RDUS, consisting of 21 statements, was developed in Türkiye in 2018 by Demirtaş et al.[12] and has undergone validity and reliability studies. In the factor analysis of RDUS, the Kaiser-Meyer Olkin test result was 0.836, and Cronbach's alpha coefficient was 0.789, indicating that the validity and reliability values of the scale are high. This provides the opportunity to make a standard comparison with the information obtained from other studies. As the scores obtained from the scale increase, the level of knowledge regarding rational drug use also increases. The cutoff value for the scale was determined as 34 points. Therefore, individuals scoring 35 or higher were considered to have knowledge of rational drug use[12]. The minimum score that can be obtained from the scale is 0, and the maximum score is 42. Based on the RDUS scores, patients were divided into two groups: those with knowledge of rational drug use (≥35 points) and those without knowledge of rational drug use (<35 points).

The data obtained from the study were analyzed using the IBM Statistical Package for the Social Sciences (SPSS) 22.0 software. The Shapiro-Wilk test was used to assess the normal distribution of the parameters. Quantitative data were expressed as mean±standard deviation (SD), and qualitative data were presented as frequency and percentage.

The chi-square test was used to assess whether there were significant differences between those with and without knowledge of rational drug use in terms of gender, type

Table 1. Comparison of data between patients with and without rational drug use knowledge

	Total (n=234) %, (n)	RDUS (n=140) Mean±SD* or %, (n)	NRDUS (n=94) Mean±SS* or %, (n)	p
Gender				
Female	57.7 (135)	67.1 (94)	43.6(41)	**<0.001****
Male	42.3 (99)	32.9 (46)	56.4 (53)	
Diabetic Drugs				
Only OAD	65.4 (153)	64.3 (90)	67.0 (63)	0.666**
Only Insulin and insulin+OAD	34.6 (81)	35.7 (50)	33.0 (31)	
Education				
Literate	3.4 (8)	2.2 (3)	5.3 (5)	**<0.001****
Primary and secondary school	68.8 (161)	62.1 (87)	78.7 (74)	
High school	15.8 (37)	17.1 (24)	13.8 (13)	
College/University	12.0 (28)	18.6 (26)	2.1 (2)	
Marital status				
Married	82.9 (194)	83.6 (117)	81.9 (77)	0.770**
Single	6.0 (14)	6.4 (9)	5.3 (5)	
Widowed/Divorced	11.1 (26)	10.0 (14)	12.8 (12)	
Social security				
Yes	91.9 (215)	91.4 (128)	92.6 (87)	0.757**
No	8.1 (19)	8.6 (12)	7.4 (7)	
Other Chronic Diseases				
Yes	76.5 (179)	78.6 (110)	73.4 (69)	0.361**
No	23.5(55)	21.4 (30)	26.6 (25)	
Age (year)	57.9±11.1	57.0±11.5	59.3±10.3	0.101***
Income(TL)	3937±2311	4323±2752	3361±1224	**0.009*****
Duration of diabetes (year)	10.2±7.2	9.9±7.4	10.6±6.9	0.325***
BMI (kg/m^2)	30.9±6.0	31.2±6.3	30.5±5.6	0.410***
HbA1c (%)	7.9±1.9	7.9±1.8	8.1±2.0	0.574***
RDUS	34.9±5.8	38.86±2.27	28.89±3.91	**<0.001*****

RDUS: Rational Drug Use Scale; NRDUS: Non Rational Drug Use Score; OAD: Oral Antidiabetic Drug; BMI: Body Mass Index; *Mean±SD; **Chi-square test; ***Mann-Whitney U test.

of diabetes medication used, educational status, marital status, occupation, social security status, and presence of accompanying chronic diseases. The Mann-Whitney U test was used to evaluate whether there were significant differences between those with and without knowledge of rational drug use in terms of age, income level, duration of diabetes diagnosis, BMI, and HbA1c.

Logistic regression analysis was performed to predict knowledge of rational drug use based on gender, education level, income level, insulin use, HbA1c, duration of diabetes, presence of chronic diseases other than diabetes, and BMI. Statistical significance was set at $p<0.05$.

Results

In the study, 57.7% of the participants were female, and the mean age of the patients was 57.9±11.1 years. More than half of the patients had completed primary or middle school education. The sociodemographic data of the patients, the diabetes medication they used, the presence of accompanying chronic diseases, duration of diabetes, BMI, HbA1c, and RDUS scores were compared between groups, and the results are presented in Table 1.

Table 2. Evaluation of factors predicting rational drug use knowledge

	B (%95 CI)	p
Gender (Women)	3.478 (1.844-6.560)	**<0.001**
Education	1.731 (1.300-2.306)	**<0.001**
Income (TL)	1.000185 (1.000002-1.000369)	**0.047**
Insulin Use	1.586 (0.787-3.195)	0.197
HbA1c (%)	0.953 (0.809-1.122)	0.563
Duration of Diabetes (year)	0.975 (0,934-1.019)	0.269
Other Chronic Diseases	0.597 (0.290-1.230)	0.162
BMI (kg/m^2)	1.006 (0.957-1.058)	0.804
Constant	0.212	0.188

BMI: Body Mass Index; Hosmer-Lemeshow Test p=0.804; Nagelkerke R^2: 0.231.

The mean RDUS score of the participants was 34.9±5.8. When the RDUS score of the participants was analyzed by gender, a significantly higher RDUS score was observed in women compared to men ($p<0.001$). There was a statistically significant difference between RDUS score and education level, as well as income level ($p<0.001$ and $p=0.009$, respectively).

Gender, education level, income level, insulin use, HbA1c, duration of diabetes, presence of non-diabetic chronic disease, and BMI were evaluated as factors predicting RDUS score in the model. Gender, education level, and income level were found to significantly and positively predict RDUS score (Table 2).

Discussion

In this study, which investigated rational drug use knowledge and related factors in patients with type 2 diabetes, gender, education level, and income were found to be factors affecting RDUS score. It was determined that individuals with higher income and education levels had higher RDUS scores.

In a study conducted by Demirtaş et al.[12] on individuals aged 18 years and older who applied to a primary healthcare centre, it was found that women and individuals with high school education or above had higher rational drug use scores. A study conducted in China on individuals aged 18 years and older who visited a secondary healthcare institution found that rational drug use knowledge was higher in women and individuals with higher education levels[13]. Similar to these studies, our study found that being female and having a higher education level significantly increased RDUS score.

There are studies in the literature that have measured rational drug use knowledge in different age groups[14-16]. A study conducted on individuals aged 65 years and older who applied to 10 primary healthcare centres in the centre of Kırşehir found no significant relationship between rational drug use and age[16]. Our study was conducted on individuals aged 18 years and older, and no significant difference in age was found between the two groups.

In a study conducted by Yapıcı et al.[17] on individuals applying to primary healthcare institutions, 30.0% of the participants were single, and singles were found to exhibit more irrational drug use behaviour. In a study conducted in Istanbul on individuals aged 18 years and older, 55.3% of the participants were single, and it was found that singles had lower attitudes towards rational drug use[18]. A study conducted on patients applying to secondary healthcare institutions in Tekirdağ found that 13.3% of the participants were single, and no difference was found in rational drug use between married and single individuals[19]. In a study conducted by Beggi and Aşık on individuals applying to an education and research hospital family medicine clinic in Antalya, 68.75% of the participants were married and 31.25% were single, and it was found that married individuals used their prescription medications more regularly and had higher rates of visiting a doctor when they got sick[20]. In our study, single patients accounted for 6.0% of the participants, and there was no significant difference in RDUS score between singles and married individuals, which may be due to the inadequate number of single participants in the study.

In a study conducted by Dağtekin et al.[9] it was found that 75.6% of the participants had a moderate income level and 8.3% had a poor income level, and it was evaluated that attitudes and behaviours towards rational drug use were riskier in the group with a poor income level. According to a study by Sahin et al.[21] no significant relationship was found between income level and rational drug use. In our study, it was found that an increase in income level significantly increased RDUS score.

According to a study conducted by Beggi and Aşık, those without social security used their home medications more[20], while a study by Ercan and Biçer found that 94.6% of the participants had social security[22]. In our study, 91.9% of the research group reported having social security, and there was no significant difference in social security between the groups with and without rational drug use knowledge.

In a study conducted by Delibas et al.[23] using the Modified Morisky Scale to assess medication adherence in diabetic patients, it was found that 43.5% of the patients were using only oral antidiabetic drugs (OAD), and no differences were observed between the groups using OAD, insulin+OAD, and insulin only. In our study, it was found that 65.4% of the participants were using only OAD, while 34.6% were using insulin. Additionally, no statistically significant difference was found between RDUS score and insulin use.

Adults with a body mass index (BMI) of 25 or higher are at risk for type 2 diabetes[24]. In a study by Özdamar et al.[25] conducted at a tertiary hospital obesity clinic, the mean BMI was found to be 37.1±5.7 kg/m^2. According to the findings of the study, certain indicators such as the average number of medications per prescription and the percentage of prescribed antibiotics were deemed appropriate when compared to WHO standards. However, parameters such

as the percentage of medications prescribed using generic names and the percentage of essential medications prescribed deviated significantly from the ideal values recommended by the WHO[25]. In our study, the mean BMI of the participants was 30.9±6.0 kg/m^2, and there was no significant difference in BMI between the groups with and without comorbidities. However, adequate BMI control was not observed in diabetic patients.

In a study conducted on individuals applying to primary healthcare institutions, it was found that 37.8% of the participants had at least one chronic disease, and metabolic syndrome was detected in 53.1% of those with chronic diseases[9]. In a study by Kılıc et al.[10] conducted in Denizli, the rate of self-medication without consulting a physician was lower among individuals with chronic diseases, and rational drug use was lower among those without chronic diseases. In a study by Akkus et al.[26] investigating the medication use knowledge of individuals aged 60 and above applying to primary healthcare centres in Kars, it was found that 98.7% of the participants had at least one chronic disease, 76.3% used their medications regularly, 47.4% were aware of the effects, 73.7% were unaware of potential side effects, and 82.9% needed assistance with medication use. In a study by Akyol et al.[27] 58.6% of the participants had a chronic disease accompanying diabetes. In our study, 76.5% of the participants had a chronic disease other than diabetes, and no significant relationship was found between having an additional chronic disease and having an adequate RDUS score.

Limitations of the Study

The data for our study were collected in 2021, during the active period of the Covid-19 pandemic.

Our study was conducted in a single center in Istanbul, and the results may vary in different regions of Türkiye. The study focused only on type 2 diabetes patients attending the diabetes clinic to assess rational drug use. There is a need for studies on different populations and disease groups to explore rational drug use in various contexts.

Conclusion

In our study, a significant portion of diabetic patients (40%) were found to have inadequate RDUS scores, particularly among males and those with lower education and income levels. The lack of rational drug use knowledge can lead to complications in diabetes management, imposing a significant burden on both the individual and society. Therefore, it is crucial for individuals with diabetes to have sufficient rational drug use knowledge to prevent potential complications and reduce unnecessary medical expenses.

Conducting more informative campaigns and providing education on rational drug use to diabetic patients can contribute to increasing their knowledge of rational drug use. It is important to provide information on rational drug use to type 2 diabetic patients in primary care settings, as it facilitates easier access to healthcare and enables effective patient monitoring.

The article is derived from the thesis.

Ethics Committee Approval: The study was approved by Haydarpasa Numune Training and Research Hospital Clinical Research Ethics Committee (No: HNEAH-KAEK 2021/53, Date: 15/02/2021).

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